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NUCLEAR REGULATORY COMMISSION

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IN THE MATTER OF:

MEETING BETWEEN THE NRC STAFF

and

STAFF OF HOUSTON LIGHTING AND POWER COMPANY

Regarding

THE ALLENS CREEK SAFETY EVALUATION REPORT

Place - Bethesda, Maryland

Date - Wednesday, 20 December 1978

Pages 1-86

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MEETING BETWEEN THE NRC STAFF

and

STAFF OF HOUSTON LIGHTING AND POWER COMPANY

Regarding

THE ALLENS CREEK SAFETY EVALUATION REPORT

Room P-500  
Phillips Building  
7920 Norfolk Avenue  
Bethesda, Maryland

Wednesday, 20 December 1978

8:00 a.m.

PRESENT:

On behalf of Houston Power & Light Company:

Messrs. Sumpter, White, Richards, Borella and Newman.

On behalf of NRC Staff:

Messrs. Moon, Boyd, Ross, Vassallo, Varga, Mattson, Schroeder,  
DeYoung, Muller, Hebdon, Tedesco, Novak, Pawlicki, Bosnak,  
Schauer, Chopra, Hanauer, Houston and Denise.

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P R O C E E D I N G S

MR. MOON: Would the meeting come to order, please.

This is a meeting with two participating groups.

The first group is Houston Lighting & Power Company, the Applicant for permits to construct and operate Allens Creek Nuclear Generating Station No. 1. That is docket No. 050-466.

The second group represents the Regulatory Staff of the Nuclear Regulatory Commission, specifically Division of the Office of Nuclear Reactor Regulation. Division of Project Management is represented by Roger Boyd, Director, on my left; Deputy Director, Danny Ross, on my right; the Assistant Director for Light Water Reactors, Dominick Vassallo; the Branch Chief for Light Water Reactors Branch 4, Steve Varqa; and myself, Calvin Moon. I am the Licensing Project Manager for the Allens Creek Review.

The Division of Safety Systems will be represented later, I believe, by Dr. Roger Mattson, Director; Deputy Director Frank Schroeder.

The Division of Site Safety and Environmental Analysis is represented by Richard DeYoung, Director; Dan Muller, the Assistant Deputy Director -- the Deputy Director may or may not be here. I am not sure.

There will be other Assistant Directors from those two divisions, Branch Chiefs and Reviewers, that will be in

mm 1 attendance part time.

2 The purpose of the meeting is to discuss the  
3 status of certain issues in the Staff's review of the Allens  
4 Creek application, specifically in the safety review, and  
5 the technical considerations for resolving those issues.

6 With respect to the conduct of the meeting, I have  
7 passed out an agenda. After I finish a few additional remarks  
8 here, I will ask the Applicant if he has any introductory  
9 remarks, and after that Mr. Boyd may want to say a few words.

10 At that time we would go into the agenda as shown  
11 here. We have done some rather tight scheduling. We will  
12 have to try to stick to the schedule very closely, or we may  
13 lose some people later on in the morning. The schedule is  
14 arranged by technical areas. The subheadings are, first of all,  
15 closed issues. These will require some discussion. In many  
16 cases I can simply do that myself. In other cases, there will  
17 be technical assistance.

18 The open issues may require somewhat more  
19 discussion.

20 By closed issues, this may mean several things  
21 which will become apparent as we go along. It may be that the  
22 Staff has now completed the review and the issue has gone  
23 away. It may be that a position has been taken, or it may be  
24 that we know that some clarifying amendments to the application  
25 are forthcoming.

mm 1 The open issues may be questions of review not  
2 being complete, of some disagreement yet between the Staff  
3 and the Applicant.

4 The meeting is being recorded. I will ask that  
5 each of you try to speak one at a time.

6 I think that is about all I have to say.

7 Jim, are you the spokesman?

8 MR. SUMPTER: We don't have any introduction.

9 MR. MOON: Would you like to introduce just a  
10 few of the people?

11 MR. SUMPTER: I am Jim Sumpter, Manager, Nuclear  
12 Department, Houston Power & Light Company.

13 This is John White, my License Supervisor.

14 Lonnie Richards, our Allens Creek Licensing  
15 Engineer.

16 Ed Borella from EBASCO Licensing.

17 And, Jack Newman.

18 MR. MOON: Roger?

19 MR. BOYD: Let me jump to the end of the meeting,  
20 perhaps and sum up what we have all done here today. I think  
21 it is appropriate to do it at the beginning, however, so  
22 that you people can appreciate exactly the things we are trying  
23 to lay on in an effort to complete the Allens Creek Review  
24 and get on with the proceedings.

25 You have before you a list of, I guess, some dozen

1 and a half items. Cal has characterized them as open and  
2 closed, whatever. The point is we have spent two or three  
3 days in the last week paring down all of the outstanding  
4 issues to the present status. You can see a lot of them are  
5 closed, have been closed in just the last day or so. But  
6 still a lot of them are remaining open as late as yesterday.

7 In our working on these issues we set up a  
8 tentative schedule which I will characterize very carefully  
9 as a target schedule that we hope to meet. I wouldn't want  
10 you people, especially Jack, to take this as an ironclad  
11 commitment. It is not. But I think it is a target that is  
12 reasonably achievable.

13 It requires quite a bit of work on our part and  
14 may, in fact, require an awful lot of work on your part, some  
15 of which, hopefully, we can take care of today.

16 What we are targeting is to get all of the inputs,  
17 all of the necessary inputs to the SER collected by about  
18 January 8th. We hope in the intervening period between the  
19 8th and the 15th of January, to get the SER put together in  
20 a substantial draft form, get it over to OELD by about that  
21 time, get their comments and reviews, polish it as necessary  
22 and get it to the printers by January 26th.

23 On that schedule we think we can make our  
24 previous prediction of about February 1st for the publication  
25 of the SER come true. It is not an unreasonable schedule. It

1 is also not a nice, comfortable schedule by a long shot.

2 As I pointed out earlier, and repeat hopefully for  
3 emphasis, probably an awful lot depends on how we can handle  
4 all the open issues. And, hopefully, within the next few  
5 days, whatever it takes on behalf of the utility applicant, we  
6 can close these out.

7 I suggest we just go ahead and whack at it.

8 MR. MOON: All right.

9 MR. ROSS: I have one question: Will there be  
10 anyone from GE later this morning?

11 MR. WHITE: No.

12 MR. MOON: All right, we will take the first item on  
13 the agenda. This item is the low-pressure gas pipeline hazards  
14 analysis.

15 The Applicant has provided information in response  
16 to a request that we had made earlier.

17 Wayne Houston, Branch Chief for Accident Analysis  
18 Branch is here. Wayne?

19 MR. HOUSTON: It is liquified petroleum gaslines  
20 involved in this question.

21 You responded to a request for information in  
22 August. We have not had an opportunity to review that, or even  
23 to look at that response until quite recently.

24 We find that the response is indirect rather than  
25 direct, and analysis was provided of what is judged to be on

mm

1 your part, apparently, the most serious accident that could  
2 occur with respect to that particular pipeline.

3 We are not yet sure whether or not we agree with  
4 you. If we do, we will have no further requests for information,  
5 and we will not press for the specific information that we  
6 requested.

7 If we do not, we will probably press for or request  
8 the specific information that we requested earlier.

9 We would expect and hope that our analysis can be  
10 completed within the next couple of weeks. We do have a  
11 problem in this area because our Staff resources for reviewing  
12 or evaluating these kinds of situations are quite limited, and  
13 there have been a number of very high-priority issues that they  
14 have been assigned to over the past several months.

15 MR. NEWMAN: Wayne, may I just ask a question for  
16 the record: Do you at this time know of any additional informa-  
17 tion that is required from the Applicant?

18 MR. HOUSTON: Not as today, no.

19 MR. SUMPTER: Do you have a specific date by which  
20 your review will be completed?

21 MR. HOUSTON: I can't give you a specific date. I  
22 am hopeful that within the next two weeks we will know whether  
23 or not it is necessary for us to ask for additional information.

24 MR. BOYD: How does this line up with our trying to  
25 get this by January 8th?

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1 Is this a reasonable target, or is this likely to  
2 be merely an open issue?

3 MR. HOUSTON: I would conjecture right now there is  
4 about 50 percent chance of being an open issue.

5 MR. VARGA: By that date?

6 MR. HOUSTON: Yes, sir.

7 MR. MOON: Okay, if there is no other discussion,  
8 we will move on to the next item.

9 This is an area of Site --

10 MR. SUMPTER: Can we get a committal on a date? You  
11 have had this thing since August, and we are trying to get  
12 this plant moving.

13 Can't we commit to a specific date?

14 MR. BOYD: Yes, the specific date is --

15 MR. SUMPTER: Maybe in a couple of weeks?

16 MR. BOYD: We are trying to get all the inputs in  
17 by January 8th.

18 MR. NEWMAN: I think what he is asking, Roger, is the  
19 date when we will be told whether we need additional  
20 information.

21 MR. BOYD: I think that is reasonable.

22 We ought to try, if possible, to have at least done  
23 a preliminary look at this.

24 MR. HOUSTON: This comes into direct conflict with  
25 some of the high-priority issues that we are looking at. And

mm 1 I'm not sure it is up to me to resolve which comes first.

2 MR. SUMPTER: I can't envision that everything has  
3 been higher priority than Allens Creek since August.

4 MR. BOYD: I can.

5 If you would like to move the meeting to that  
6 level I would be more than delighted to move it to that level.  
7 But we are here to solve problems. Some we are not going to be  
8 able to, some we are.

9 Dick, maybe you can add your muscle to --

10 MR. SUMPTER: Who can commit you people to a date?

11 MR. WHITE: What I think we are worried about is  
12 that if there is additional information required, or analysis  
13 required, you know it is going to take us sometime to do it,  
14 so you know we are very sensitive to this. So that as soon as  
15 you can possibly let us know, you know, specific requests --  
16 you know, the faster we can get on with whatever you need from  
17 us --

18 MR. HOUSTON: I can say this: We have moved Allens  
19 Creek up to No. 2 on our list of priority in this area. I am  
20 just not certain about what seems today to be taking No. 1  
21 priority. It has not been anywhere near No. 2 in the last  
22 several months.

23 MR. BOYD: Is the guy that is reviewing that going  
24 to be here next week?

25 MR. HOUSTON: He will be in next week.

1 MR. BOYD: Can we get -- recognizing that next  
2 week for those of us who are going to be here, it should be  
3 relatively peaceful. And we are all looking forward to  
4 having an opportunity to get some work done.

5 Why don't you stick your collective neck out, Wayne,  
6 and before the end of next week try to get some sort of feed-  
7 back to us that we can pass on one way or the other to the  
8 utility.

9 MR. HOUSTON: All right.

10 MR. WHITE: Good.

11 MR. BOYD: He nods, which should be taken as  
12 affirmative.

13 (Laughter.)

14 I appreciate it, Wayne.

15 MR. MOON: The next area is site technology.  
16 The first item there I have called foundation engineering.

17 Our SER Supplement No. 1 was issued in June of  
18 1975. There were some issues not resolved at that time.

19 During the present review we have requested  
20 additional information that has been provided. I think the  
21 review is essentially complete.

22 The Corps of Engineers has been involved. I believe  
23 we have a manpower problem with respect to actually getting  
24 the SER input finalized.

25 Richard Denise?

1 MR. DENISE: Yes.

2 With respect to that item, we have done everything  
3 except write up the reviews. We haven't identified any need  
4 for additional information from you. We have recieved all  
5 that we know that we need and our consultants report they are  
6 now writing them up and we intend to conform to the schedule  
7 Mr. Boyd outlined earlier.

8 MR. WHITE: So you don't need anything from HL&P  
9 on this issue?

10 MR. DENISE: That's right.

11 MR. MOON: Okay.

12 The next item called criteria for control of  
13 sediment in ultimate heat sink. The ultimate heat sink is a  
14 depression in the bottom of the cooling lake.

15 The PSAR states that there may be a necessity to  
16 remove sediment during the life of the plant. The Staff had  
17 requested some additional information in the nature of what  
18 are the criteria for making that decision.

19 There are then implications beyond this. There may  
20 be a need later to monitor the accumulation of sediment,  
21 perhaps some tech specs and so on.

22 I believe the Applicant's response at this time is  
23 that he does not feel that this request needs to be answered  
24 and that this can be handled later on at the operating license  
25 review.

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MR. RICHARDS: Do you have anything?

MR. DENISE: Yes.

I wanted to say that we would like to see a proposal scoped out. We don't mean to hold you to hard and fast numbers as you would put in the tech specs, but we would like to see how you would intend to handle it. And if you don't, we will make some determinations on that so we can close this item.

We can make it a condition. But I think there is no reason at all, no practical reason not to come closer together on it than merely saying we would like to see something and on your side your saying, we will handle it in the tech specs.

Do you have any ideas, thoughts, proposals?

MR. WHITE: Yes, we did.

As you recall, in our previous phonecalls on this issue --

MR. DENISE: Between Lyman Heller and Ed Hawkins of our Staff, I believe talked to you all. I think it is satisfactory, but it is not in hand.

MR. WHITE: I believe what we were talking about at that time was some sort of criteria limit on slope, a number like 20 to 1. We are willing to document that we would periodically verify the slope was not exceeding -- or approaching that type of a limit. And we are prepared

mm 1 to document it, if that was the type of criterion you were  
2 talking about.

3 MR. DENISE: I think that was the closeout. We  
4 would rather get it closed out than to be arguing about it, or  
5 trying to determine it later on.

6 When can we get that kind of thing?

7 MR. WHITE: What we would like to do on this issue  
8 is, call EBASCO and verify what the number should be. And  
9 we can get back with you later today and write down the  
10 words, answer the questions, take out the statement that  
11 it was going to be handled during the PSAR stage. Replace  
12 the statement that says "criteria are going to be established  
13 such as a slope criteria of 20 to 1 of the sediment on the  
14 sides of the ultimate heat sink."

15 And we should be able to provide that amendment,  
16 you know, tomorrow.

17 MR. DENISE: Fine. That will take care of it.

18 MR. WHITE: I guess you are not going to stay for  
19 the whole meeting. I guess we can contact whoever we need  
20 to when we get the information?

21 MR. MOON: Yes.

22 MR. WHITE: The EBASCO people are supposed to be  
23 here about 9 o'clock, and Ed Borella is going to leave the  
24 meeting and clarify that.

25 MR. DENISE: Fine, we will close it out and be able

mm 1 to say it is taken care of.

2 MR. MOON: Dick, is there anything else in DSE?

3 MR. DE YOUNG: That's the only three.

4 MR. SUMPSTER: We have a draft amendment with a  
5 blank page. We will write the numbers in and show them to you  
6 and go back and type and print it tomorrow and send it in.

7 MR. DE YOUNG: On that last issue.

8 MR. DENISE: Fine.

9 MR. MOON: Okay. The next item is reactor safety.  
10 Robert Tedesco, Assistant Director for Reactor  
11 Safety has joined us.

12 The first item on the list is titled recirculation  
13 pump postulated missiles.

14 I believe Mr. Tedesco has a Staff position to  
15 discuss. I think this problem generally revolves around the  
16 questions of what is in the Allens Creek PSAR versus the  
17 generic considerations.

18 Bob Tedesco.

19 MR. TEDESCO: Yes.

20 The way the situation is developing, we are  
21 approaching it on a generic basis. And once that issue has  
22 been resolved, we would expect to apply it generically, you  
23 know, to all the plants including Allens Creek.

24 The interim is an issue that deals with the  
25 quality of the design plus the low probability of any event

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1 occurring.

2 So, you know, we haven't really established  
3 clearly that there would, indeed, be a missile that might  
4 result from this type of event that would indeed go through  
5 the housing and cause a problem.

6 But the Staff is presently going ahead with its  
7 evaluation generically and looking at everything.

8 MR. WHITE: On this issue we proposed -- once  
9 before we referenced that on the NEDA Report. We have got the  
10 pages in the PSAR we feel to be changed to delete the reference  
11 of the NEDA Report which state:

12 "The Applicant will implement the generic  
13 resolution of these discussions between GE and NRC."

14 And another page it says essentially the same  
15 thing. So as we understand, that should resolve the issue.

16 MR. TEDESCO: Yes, sir. That is the general idea.

17 MR. WHITE: Okay.

18 And we have had the amendment already typed up,  
19 so if you want to see the words exactly, we have got several  
20 copies over here to show you while we are at the meeting.

21 Would you show him the words?

22 MR. RICHARDS: Yes.

23 (Handing document to Mr. Tedesco)

24 MR. TEDESCO: I was reading the copy of the recent  
25 amendment or proposed amendment, and the Applicant has

mm 1 indicated that they would implement the generic resolution of  
2 this matter.

3 So that would be consistent with our position.

4 MR. MOON: Okay.

5 MR. SUMPTER: Would it help speed up your time  
6 calendar if we gave you a copy of this amendment and you could  
7 check the words when they came in to see if they are as we  
8 say -- as he has signed off on the words that are duplicated  
9 when the actual amendment comes in?

10 DR. MATTSON: That's fine.

11 Bind them into the record. When you put your  
12 record together, just put them in there.

13 Please give the reporter a copy.

14 MR. WHITE: We have a couple of typos in there, that  
15 we will discuss with you.

16 MR. BOYD: For purposes of this, just mark them out.

17 MR. WHITE: I just want to make you aware that  
18 there are a couple of typos.

19 (Document follows)

20

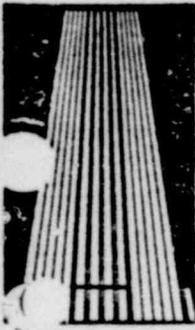
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Houston  
Lighting  
& Power  
Company

Electric Tower  
P.O. Box 1700  
Houston, Texas 77001

*Encl. 1*

December 20, 1978  
AC-HL-AE-271

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Sir:

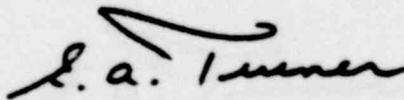
Allens Creek Nuclear Generating Station  
Unit 1  
Docket No. 50-466  
Amendment 49

---

Please find under separate cover sixty (60) copies of Amendment 49 to the Houston Lighting & Power Company Allens Creek Nuclear Generating Station Unit 1 PSAR. A copy of this transmittal letter is attached to each amendment copy.

Amendment 49 consists of additional PSAR information related to issues identified in telephone conversations between Houston Lighting & Power Company and the Nuclear Regulatory Commission.

Very truly yours,



E. A. Turner  
Vice President  
Power Plant Construction  
& Technical Services

LDR/bk1

cc: J. G. Copeland (Baker & Botts)  
R. Gordon Gooch (Baker & Botts)  
J. R. Newman (Lowenstein, Newman, Reis,  
Axelrad & Toll)  
P. A. Horn

Before the  
UNITED STATES NUCLEAR REGULATORY COMMISSION

Docket No. 50-466

Allens Creek Nuclear Generating Station Unit 1

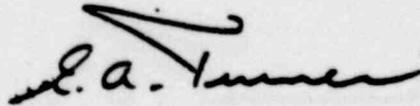
Amendment 49 to the  
PSAR

Houston Lighting and Power Company, applicant in the above captioned proceeding, hereby files Amendment 49 to the Preliminary Safety Analysis Report filed in connection with its application.

Amendment 49 consists of additional PSAR information related to issues identified in telephone conversations between Houston Lighting & Power Company and the Nuclear Regulatory Commission.

Respectfully submitted

HOUSTON LIGHTING & POWER COMPANY



E. A. Turner  
Vice President  
Power Plant Construction  
& Technical Services

STATE OF TEXAS

COUNTY OF HARRIS

E. A. TURNER, being first duly sworn, deposes and says:  
That he is Vice President of HOUSTON LIGHTING & POWER COMPANY, an  
Applicant herein; that the foregoing amendment to the application  
has been prepared under his supervision and direction; that he  
knows the contents thereof; and that to the best of his knowledge  
and belief said documents and the facts contained therein are true  
and correct.

DATED: This 19<sup>th</sup> day of December, 1978.

Signed:

E. A. Turner  
E. A. Turner

Subscribed and sworn to before me  
this 19<sup>th</sup> day of December, 1978.

J. Ann G. Keath  
Notary Public in and for the  
County of Harris, State of Texas

My commission expires

11-26-79.

ACNGS-PSAR

HOUSTON LIGHTING & POWER COMPANY  
ALLENS CREEK NUCLEAR GENERATING STATION - UNIT NO. 1  
PRELIMINARY SAFETY ANALYSIS REPORT  
AMENDMENT NO. 49  
INSTRUCTION SHEET

This amendment contains additional information which is submitted in response to telephone conversations between HL&P and NRC personnel. Each revised page bears the notation Am. No. 49, 12/20/78 at the bottom of the page. Vertical bars with the number 49 representing Amendment No. 49 have been used in the margin of the revised pages to indicate the location of the revision on the page. The revised pages have the question number (eg Q010.5) next to the appropriate information which responds to the question.

The following page removals and insertions should be made to incorporate Amendment 49 into the PSAR.

CHAPTER 3

Remove  
(Existing Pages)

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11\*  
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3.5-16  
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Insert  
(Amendment 49 Pages)

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11\*  
3.5-3  
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3.9-6b

CHAPTER 5

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5.2-20c  
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APPENDIX C

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APPENDIX K

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APPENDIX N

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## ACNGS-PSAR

EFFECTIVE PAGES LISTING  
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DESIGN OF STRUCTURES, COMPONENTS, EQUIPMENT AND SYSTEMS

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from turbinning of the driven end of the equipment due to blowdown of the system pressure upon rupture of the system pressure boundary.

The most substantial piece of rotating equipment is the recirculation pump and motor which, in the event of a major recirculation line break, and under certain system blowdown conditions can theoretically reach overspeed beyond practical design limitations and result in ejection of various parts of the pump and motor. This hypothetical situation is currently the topic of discussions between GE and the NRC. The Applicant will implement the generic resolution of these discussions.

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### 3.5.2.2 Turbine Missiles

#### 3.5.2.2.1 Introduction

The potential for damage to safety related structures, systems and components due to turbine failure has been evaluated to determine whether additional protection, beyond that inherently provided by plant building orientation and existing structural shielding, need be provided to further reduce the probability of damage.

The probability of damage was calculated for each Category I structure by evaluating the product of the probability for missile generation and the probability of impact on the structure.

The evaluation of the individual probability components and a summary of the overall damage probability is discussed in the following sections.

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SECTION 3.5: REFERENCES

- 3.5-1 P. W. Marriott, et. al., "The Loss-of-Coolant Accident and the Environment - A Probabilistic View", ASME Publication 72-WA/NE-9
- 3.5-2 Reference 3.5-2 has been deleted. | 49
- 3.5-3 E. E. Zwicky, Jr., TR-675L 211 GE, "An Analysis of Turbine Missiles Resulting from Last Stage Wheel Failure", October 3, 1967.
- 3.5-4 J. E. Downs, General Electric Company, "Hypothetical Turbine Missiles - Probability of Occurrence", March 14, 1973.
- 3.5-5 R. Salvatori, Westinghouse, "Failure Angles of Discs", May 24, 1971.
- 3.5-6 J. V. Rotz, "Results of Missile Impact Tests on Reinforced Concrete Panels," Vol. 1A, pp. 720-738, Second Specialty Conference on Structural Design of Nuclear Plant Facilities, 1975, New Orleans, LA. | 35 (C)
- 3.5-7 R. C. Gwaltney, "Missile Generation and Protection in Light-Water-Cooled Power Reactor Plants", USAEC Report ORNL-NSIC-22, September, 1968.
- 3.5-8 "Structural Analysis and Design of Nuclear Plant Facilities," Draft, Trial Use and Comment, Prepared by The Committee on Nuclear Structures and Materials of the Structural Division of the ASCE, 1976. | 35 (C)
- 3.5-9 C. V. Moore, Nuclear Engineering and Design, "The Design of Barricades for Hazardous Pressure Systems", 1967.
- 3.5-10 C. V. Chelapti, R. P. Kennedy and I. B. Wall, "Probabilistic Assessment of Aircraft Hazard for Nuclear Power Plants" NED-19 (1972), pp. 358-360, North-Holland Publishing Company.
- 3.5-11 J. M. Biggs, "Introduction To Structural Dynamics", (1964) pp. 43-49 and 76-79, McGraw Hill Book Company.
- 3.5-12 R. A. Williamson and R. R. Alvy, "Impact Effect of Fragments Striking Structural Elements", of Halmen and Narver, Inc., NP-6516 (1957).
- 3.5-13 W. B. Cottrell and A. W. Savolinen, "U. S. Reactor Containment Technology", ORNL-NSIC-5, Vol, I, Chapter 6.
- 3.5-14 A. E. Long, "A Two-Phase Approach to the Prediction of the Punching Strength of Slabs," ACI Journal, February, 1975. | 35 (C)

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- (a) Snubbers are subjected to force or displacement versus time loading at frequencies within the range of significant modes of the piping system.
- (b) Displacements are measured to determine the performance characteristics specified.
- (c) Tests are conducted at various temperatures to insure operability over the specified range.
- (d) Peak test loads in both tension and compression will be equal to or higher than the rated load requirements.
- (e) The snubbers are also tested for various abnormal environment conditions. Upon completion of the above abnormal environmental transient test, the snubber shall be tested dynamically at a frequency with a specified frequency range. The snubber must operate normally during the dynamic test.

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c) Snubber Installation Requirements

As installation instruction manual is required by the suspension design specification. This manual is required to contain instructions for storage, handling, erection and adjustments (if necessary) of snubbers. Each snubber has an installation location drawing, which contains the installation, location of the snubber on the pipe and structure, the hot and cold settings, and additional information needed to install the particular snubber.

The suspension design specification requires that snubbers be provided with position indicators to identify the rod position. This indicator facilitates the checking of hot and cold settings of the snubber, as specified in the installation manual, during plant preoperational and startup testing.

d) Inspection, Testing, Repair and/or Replacement of Snubbers

The suspension design specification requires that the snubber supplier prepare an installation instruction manual. This manual is required to contain complete instructions for the testing, maintenance and repair of the snubber. It also contains inspection points and the period for inspection.

The suspension design specification requires that hydraulic snubbers be equipped with a fluid level indicator so that the level of fluid in the snubber can be ascertained easily.

3.9.2.9 Component Supports

Piping component supports for ASME Code Class 1, 2, 3 or MC systems will be designed in accordance with ASME Section III NF Load combinations for piping component supports are given in Table 3.9-7 for Ebasco. For GE Class 1 supports see the loading combinations listed by Table 5.2-2a. General Electric does not supply Class 2, 3, or MC supports. Allowable stress limits are given in Table 3.9-8. In situations where a device which is not governed by the rules of the ASME B&PV Code is in the load path for the support of ASME

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During reactor startup and hot standby, the dissolved oxygen content of reactor water may be higher than during normal power operation. During this period more restrictive limits are established. After power operation has been established boiling deaerates the reactor water reducing the influence of oxygen on potential chloride stress corrosion cracking.

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The relationship of chloride concentration to specific conductance measured at 25°C for chloride compounds such as sodium chloride and hydrochloric acid can be calculated. Values for these compounds essentially bracket values of other common chloride salts or mixtures at the same chloride concentration. Surveillance requirements are based on these relationships. The sampling frequency when reactor water has a low specific conductance is adequate for calibration and routine audit purposes. When specific conductance increases, and higher chloride concentrations are possible, or when continuous conductivity monitoring is unavailable, increased sampling is provided.

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Coolant Chemistry Requirements are summarized in Table 5.2-11.

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#### 5.2.4 FRACTURE TOUGHNESS

##### 5.2.4.1 Compliance with Code Requirements

The reactor vessel pressure retaining components comply with the requirements of NB-2300 as written in the Summer 1972 Addenda of the ASME Code, Section III (Formerly Code Case 1514).

The reference temperature,  $RT_{NDT}$  will be established for all required pressure-retaining materials used in the construction of Class I vessels. This includes plates, forgings, weld material and heat affected zone. The  $RT_{NDT}$  differs from the nil-ductility temperature, NDT, in that in addition to passing the drop weight test, three Charpy-V Notch specimens (transverse) must exhibit 50 ft-lbs absorbed energy and 35 mil lateral expansion at 60 F above the  $RT_{NDT}$  temperature.

The ferritic materials used for piping, pumps and valves of the Reactor Coolant Pressure Boundary are 2-1/2 inches or less in thickness and are not subject to dropweight tests or the 35 mils lateral expansion; 50 ft-lb Charpy-V Notch test. Only those tests required by NB-2332 and NB-2333 for thickness 2-1/2 inches and less are performed.

##### 5.2.4.2 Acceptable Fracture Energy Levels

The initial upper shelf fracture energy levels for core belt line material (base, weld, heat affected zone) is required to be 75 ft-lb (transverse)

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minimum to allow for degradation of the upper shelf due to neutron fluences to 50 ft lb during reactor service life.

5.2.4.3 Operating Limitations

Appendix G of the ASME Code, Section III, Protection Against Non-ductile Failure, will be used in determining pressure/temperature limitations for all phases of plant operating and the additional requirements of 10 CFR 50 Appendix G for operation when the core is critical will be complied with as indicated in Section 5.2.4.6.5. The adjusted reference temperature used in determining operating limits will be based on integrated fast neutron fluence at 1/4 and 3/4 of the beltline shell thickness as appropriate. The expected shift in  $RT_{NDT}$  with neutron fluence is defined in Section 5.2.4.6.8. | 17  
Q2-  
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5.2.4.3.1 Operating Limitations During Startup and Shutdown | 17

Appendix G of the ASME Code, Section III, Protection Against Non-ductile Failure, will be used in determining pressure/temperature limitation for all phases of plant operation. | 49

5.2.4 4 Compliance with Reactor Vessel Material Surveillance Program Requirements

Reactor vessel material surveillance specimens are provided in accordance with ASTM-E-185-73. | 5

At least three sets of specimens will be provided. Each set will consist of 12 Charpy-V-Notch specimens of base material, weld material, and weld heat affected zone material so that withdrawal of samples can be per ASTM-E-185-73. Archive material per ASTM-E-185-73 will be furnished with the surveillance test specimens. | Q5.12

5.2.4.5 Reactor Vessel Annealing

In-place annealing of the reactor vessel because of radiation embrittlement is unnecessary because the predicted value in transition of adjusted reference temperature will not exceed 200°F - see 10CFR50, Appendix G, Paragraph IV.C. | 5  
Q5.11

5.2.4.6 Compliance with 10CFR50 Appendices G & H

The BWR-6 reactor design is in full compliance with Appendices G & H of 10CFR50 as follows:

5.2.4.6.1 Specimen Orientation for Original Qualification Versus Surveillance (Reference Appendix G-IIIA) | 46  
(G)

Allens Creek uses both transverse and longitudinal specimens for qualification testing. Allens Creek uses transverse specimens to meet 10CFR50 Appendix H surveillance requirements. | 49  
Q5.41  
Q5.12

Charpy-V-Notch tests as defined in NB-2321.2 are to be conducted on both unirradiated and irradiated ferritic materials; however, the special beltline longitudinally oriented Charpy specimens required by



Calculations performed in accordance with the rules of Regulatory Guide 1.99 (Figure 1) using specification limits on copper and phosphorus show that the maximum shift in  $RT_{NDT}$  for base metal would be  $77^{\circ}F$ . The maximum shift for weld metal would be  $97^{\circ}F$ .

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121.2

Actual shifts are expected to be considerably lower than those calculated using maximum specification limits of copper and phosphorus. This is especially true of the weld metal. Chemical analyses on weld metal consistently show copper below 0.08% and phosphorus below 0.02%. Therefore, it is expected that the actual  $RT_{NDT}$  shifts calculated in accordance with the rules of Regulatory Guide 1.99 will be in the range of  $50^{\circ}$  to  $70^{\circ}$  for both base metal and weld metal. Experience has shown that the initial reference temperature for beltline materials should not exceed  $+10^{\circ}F$  for base metal and  $0^{\circ}F$  for weld metal so the adjusted reference temperature at EOL is predicted to be less than  $100^{\circ}F$ , hence three capsules are used. The capsule withdrawal schedule is:

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(G)

- First capsule - one fourth service life.
- Second capsule - three fourths service life.
- Third capsule - standby.

The decrease in upper shelf energy predicted in accordance with Figure 2 of Regulatory Guide 1.99 shows a maximum decrease of 20% at a peak EOL fluence of  $4.5 \times 10^{18}$  n/cm<sup>2</sup>. Since the initial upper shelf energy is required to be 75 foot pounds, the end of life upper shelf energy will remain above 50 foot pounds.

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#### 5.2.4.6.9 Positioning of Surveillance Capsules (Ref. H II C (2))

Surveillance capsules are placed such that the neutron flux received by the capsules is not more than three times the vessel beltline surface. Typically the fluence is 1.1-1.5 times this amount.

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Capsules are not attached to the vessel but are in seal welded capsule holders. The capsule holders are mechanically retained by capsule holder brackets welded to the vessel cladding as shown in Figure 5.2-8. Since reactor vessel specifications require that all low alloy steel pressure vessel boundary material be produced to fine-grain practice, underclad cracking is of no concern. The capsule holder brackets allow the removal and reinsertion of capsule holders. These brackets are designed, fabricated, and analyzed to the requirements of Section III ASME Code.

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(G)

The insulation is either the all-metal reflective type or the conventional asbestos type. It is prefabricated into components for field installation. Removable insulation is provided at various locations to permit periodic inspection of the equipment.

Provisions taken to control those factors that contribute to stress corrosion cracking are discussed in Section 5.2.

#### 5.5.1.4 Safety Evaluation

Reactor Recirculation System malfunctions that pose threats of damage to the fuel barrier are described and evaluated in Chapter 15, "Accident Analysis". It is shown in Chapter 15 that none of the malfunctions result in fuel damage. The recirculation system has sufficient flow coastdown characteristics to maintain fuel thermal margins during abnormal operational transients.

Figure 5.5-4 shows the core flooding capability of the recirculation system. The core flooding capability of a jet pump design plant is discussed in detail in the Emergency Core Cooling Systems document filed with the AEC as a General Electric topical report (see Reference 5.7-4). The ability to reflood the BWR core to the top of the jet pumps as shown schematically on Figure 5.5-4 and discussed in Reference 4 applies to all jet pump BWR's and does not depend on the plant size or product line.

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Piping and pump design pressures for the Reactor Recirculation System are based on peak steam pressure in the reactor dome, appropriate pump head allowances, and the elevation head above the lowest point in the recirculation loop. Piping and related equipment pressure parts are chosen in accordance with applicable codes. Use of the listed code design criteria assures that a system designed, built, and operated within design limits has an extremely low probability of failure caused by any known failure mechanism.

General Electric Purchase Specifications require that the recirculation pumps first critical speed shall not be less than 130 percent of operating speed. Calculation submittal is required and verified by General Electric Design Engineering.

General Electric Purchase Specifications require that integrity of the pump case be maintained through all transients and that the pump remain operable through all normal and upset transients. The design of the pump and motor bearings are required to be such that dynamic load capability at rated operating conditions is not exceeded during the Safe Shutdown Earthquake. Calculation submittal to General Electric is required.

Analyses performed to determine if the recirculation pump can become a missile indicates that for the postulated full double-ended pipe break (LOCA) in either recirculation pump suction or discharge line, destructive pump and motor overspeed could occur. This hypothetical situation is currently the topic of discussions between GE and the NRC. The Applicant will implement the generic resolution of these discussions.

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Pages 5.5-5a, b, and c have been deleted.

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Upon a loss of offsite power, the tie breakers between the normal and ESF buses will automatically open and the standby diesel generators will automatically start. After reaching rated speed and voltage, they will automatically be connected to the ESF buses. The diesel generator automatic starting and loading sequence is discussed further in Section 8.3.1.1.10.

The two 4 KV non-safety related station service transformers will be rated 15 mva, FOA at 55 C rise, with a 112 percent supplementary rating at 65 C rise. These transformers shall be connected delta-delta with a 7 percent impedance (approximately) on a 15 mva base. |35(C)

The 4 KV normal buses 1A and 1B will be rated 3000 amps and will be provided with 3000 amp incoming breaker of 350 mva interrupting capacity. |35(C)  
ESF buses S-1, S-2, and HPCS will be rated 1200 amps. The incoming feeder breakers of these buses will be rated at 1200 amps, 350 mva 1C and all outgoing breakers of all 4 KV buses will be 1200 amps, 350 mva 1C. Buses will be protected by time overcurrent relays. The motors fed from these buses will be protected by time overcurrent and instantaneous overcurrent relay devices. The time overcurrent relays will be set to trip on overloads of 125 to 140 percent normal currents. Instantaneous overcurrent relays will trip for fault magnitude currents. A time overcurrent relay will be used to alarm for currents of 100 to 125 percent full load currents. Relay settings will be determined on an individual basis to selectively trip loads and feeders as required to insure safe plant operation. Safety related loads will have the capability of being controlled only from the control |35(D)

(C)-Consistency  
(D)-Design

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QUALITY ASSURANCE

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17.1.1C-2	33(deleted)
17.1.1C-3	33(deleted)

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Site Construction Quality Control activities will be under the administrative and technical control of the Ebasco Quality Assurance Engineering Department instead of the Construction Quality Control Department. This organizational structure is described in Table 17.1.2B-4. All Ebasco quality assurance related activities performed prior to January 1, 1977 were done in accordance with the program described in this chapter. All Ebasco quality assurance activities subsequent to January 1, 1977 will be performed in accordance with the latest HL&P and NRC accepted revision of Ebasco's Topical Report No. ETR-1001, which at present is Rev. 5, except for the site Construction Quality Control organizational changes described above and other approved modifications listed in Table 17.1.2B-3. Later NRC approved revisions to ETR-1001 may be incorporated when deemed necessary.

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If necessary to define any additional clarifications, or modifications to the project Nuclear Quality Assurance Program Manual because of HL&P contract requirements or to suit the unique Project conditions, they will be submitted for NRC acceptance in accordance with established provisions which require execution of an authorization form involving approval of specified authorities to assure, among other things, that safety and/or quality are not sacrificed or compromised. Approved changes will be incorporated in above referenced Tables, as required.

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The Ebasco Quality Program defined herein assures that structures, systems, and components important to safety as defined in Section 3.2 of this PSAR, are reliable and possess a high degree of quality. This objective is achieved by the implementation of the Ebasco Nuclear Quality Assurance Manual which defines the policy, procedures, and requirements by which Ebasco will design, purchase and erect the Allens Creek Nuclear Generating Station. Implementation of the Ebasco Nuclear Quality Assurance Manual provides a quality program which is in compliance with the requirements of the Code of Federal Regulations, 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants," and ANSI N45-2-1971, "Quality Assurance Program Requirements for Nuclear Power Plants".

17.0.C GENERAL ELECTRIC

The Quality Assurance Program for safety related activities and services for the Allens Creek Nuclear Generating Station is described in the General Electric Nuclear Energy Divisions BWR Quality Assurance Program Description, NEDO-11209-04A.

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The Ebasco Quality Assurance Manual requires that quality related activities such as inspections and tests are performed under suitable conditions and using appropriate equipment. This is achieved by inclusion of necessary requirements in procurement documents. Vendors of safety related systems, structures, components and services are required to submit to Ebasco for review, their procedures for activities such as inspection and testing. Ebasco Vendor Quality Compliance Representatives monitor these activities in Vendor shops to assure that the applicable Vendor procedures are implemented. The Ebasco Construction Quality Control Procedures are also reviewed by Materials Engineering and Quality Compliance for compliance with the applicable codes and regulatory agency requirements. The quality control activities at the construction site are also monitored by the site quality compliance personnel.

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Q1-  
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17.2.28

The Ebasco Quality Program is structured so that modifications can be made to comply with NRC regulations and industry standards as they are adopted.

The Quality Assurance program for safety related activities and services performed by Ebasco in the design, engineering, procurement, and construction of the Allens Creek Nuclear Generating Station is now described in the Ebasco Nuclear Quality Assurance Program Manual for the Allens Creek Project. This manual is a revision to Ebasco's Topical Report No. ETR-1001, which was accepted by the NRC on May 12, 1975. The revision will consist of modifying the Ebasco Site organization. The Site Construction Quality Control activities will be under the administrative and technical control of the Ebasco Quality Assurance Engineering Department instead of the Construction Quality Control Department. This organizational structure is described in Table 17.1.2B-4. All Ebasco quality assurance related activities performed prior to January 1, 1977 were done in accordance with the program described in this chapter. All Ebasco quality assurance activities subsequent to January 1, 1977 will be performed in accordance with the latest HL&P and NRC accepted revision of Ebasco's Topical Report No. ETR-1001, which at present is Rev. 7 except for the site Construction Quality Control organizational changes described above and other approved modifications listed in Table 17.1.2B-3. Later NRC approved revisions to ETR 1001 may be incorporated when deemed necessary.

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If necessary to define any additional clarifications, or modifications to the project Nuclear Quality Assurance Program Manual because of HL&P contract requirements or to suit the unique Project conditions, they will be submitted for approval in accordance with established provisions which require execution of an authorization form involving approval of specified authorities to assure, among other things, that safety and/or quality are not sacrificed or compromised. Approved changes will be incorporated in above referenced table(s), as required.

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ACNGS-PSAR

TABLE 17.1.2B -3

Project-Related  
Clarifications, or Modifications  
To Ebasco Topical Report ETR-1001 Rev. 4

1. General

Where the word "client" appears within the appropriate sections of EBASCO's Nuclear Quality Assurance Program Manual it shall be understood to mean "Houston Lighting & Power Company".

2. Deleted

3. Section QA-I-4 Design Control

Although Figure I-4.1 in Section QA-I-4, leaves the required review up to the discretion of the Lead Discipline Engineer, the Project Quality Assurance Engineer shall review all bidders lists, vendor proposals and Ebasco purchase orders to Vendors.

4. Section QA-I-5 Quality Assurance Evaluation of Suppliers/Contractors

4.1 - Paragraphs 3.1.2 and 5.1 are modified to allow for alternate methods of evaluation and qualification of supplier's capabilities by methods other than audit by Ebasco. Such methods are detailed as follows:

- a) Audits of suppliers by HL&P or others qualified to do so.
- b) Historical data is available substantiating the capability of the supplier to provide products which have performed satisfactorily in actual use and were fabricated in accordance with an acceptable quality assurance program. Such historical data shall only qualify suppliers who have provided identical or similar products in the past.

4.2 - Paragraphs 2.3, 4.1 and 5.1 are modified such that in the event Construction Contractors are awarded a contract before review and approval of their quality assurance manual or their facility, but prior to start of any safety-related work, the following shall be complied with:

- a) The "Terms and Conditions" section of the Purchase Order will stipulate that the award of the contract is predicated on:
  - 1) submittal of construction contractors quality assurance manual for review and comment by Purchaser,

Organizational and Administrative Changes  
to Ebasco Topical Report ETR 1001 Rev. 4

Site Quality Control Engineering

A Quality Control Site Supervisor and staff of engineers and specialists are assigned to each project construction site on a resident basis. The Quality Control Site Supervisor reports to the Quality Program Site Manager and is responsible for:

- (a) Performing inspection in all areas of construction, establishing and enforcing quality control documentation requirements, including procedures, specifications, drawings and purchasing documents.
- (b) Identifying and initiating correction of nonconformances to requirements indicated by the drawings, specifications, codes or procedures for items, and rejecting nonconforming items and services or when necessary requiring the stoppage of work until such nonconformance is corrected.
- (c) Assisting in organizing and administering training seminars as required to assure proper level of quality control.
- (d) Preparing inspection requirements based upon such documents as specifications, drawings, codes and standards, as established by the Engineering Department.
- (e) Supervision of Quality Control Engineers who directly supervise Quality Control Inspectors/Specialists for the various construction disciplines (Soils, Concrete, Electrical, Mechanical, Material Control, etc).
- (f) Supervision of the NDE Group who are responsible for performance and/or monitoring of nondestructive testing activities.

Records Center

A Quality Records Supervisor and staff are assigned to the project construction site on a resident basis. The functions of the Records Center Supervisor are as follows:

- (a) Establish
  - 1. Project file indexing and location, including retention and classification requirements.
  - 2. Filing and storage instructions for special process records, following manufacturer's recommendations and/or established practices.
- (b) Develop record audit checklists and process Records Deficiency Reports.

Figure 17.1.1B-2 has been deleted.  
See ETR-1001 Figure 1.2-4 Revision 3  
for the Ebasco Services Engineering  
and Construction Organization

Figure 17.1.2B-1 has been deleted.  
See ETR-1001 Figures 1.2-6 Revision 3  
and 1.2-7 Revision 3 for the Quality  
Assurance Program Organization

ACNGS-PSAR  
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REGULATORY GUIDE 1.68.1  
(Rev. 1, 1/77)

PREOPERATIONAL AND INITIAL STARTUP TESTING OF FEEDWATER  
AND CONDENSATE SYSTEMS FOR BOILING WATER REACTOR PLANTS

Applicant's Position:

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The systems described in this guide will be tested. The Applicant will provide a preoperational and initial startup test program which addresses this guide at FSAR submittal. The Allens Creek design will not preclude the test program described by this guide.

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ACNGS-PSAR

Applicant reserves the right to provide an acceptable alternative at a later date.

- C) Table 1-3, Item 5, Environmental Qualification Program for non GE supplied Class IE equipment is described in Section 3.11 of the Allens Creek PSAR. The Applicant will adopt the resolution with respect to GE supplied equipment for ACNGS as detailed in PSAR Section 3.11.2.3. The Applicant reserves the right to provide an acceptable alternative at a later date.
- D) The Applicant will adopt the resolution with respect to GE supplied equipment for ACNGS. The Applicant reserves the right to provide an acceptable alternative at a later date.
- E) The Applicant will adopt the resolution with respect to GE supplied equipment for ACNGS. The Applicant reserves the right to provide an acceptable alternative at a later date.
- F) The Applicant will adopt the resolution for ACNGS. The differences in arrangement of the ACNGS and GESSAR control room complexes will not affect conformances of the former to the necessary instrumentation and control requirements, including physical and electrical separation requirements to meet Regulatory Guide 1.75, "Physical Independence of Electric Systems". The Applicant reserves the right to provide an acceptable alternative at a later date.
- G) The Applicant will adopt the resolution for ACNGS. The Applicant reserves the right to provide an acceptable alternative at a later date. The Applicant's design will include the ATWS recirculation pump trip. The Applicant will assure that provisions are made that will accommodate ATWS modifications that are proposed by the industry for the BWR/6 in construction stage status of Allens Creek.

Open Item No.

110.6(3) In your response, you stated that for the ASME Class 1, 2, and 3 components and supports that the peaks of dynamic loads associated with plant Faulted Conditions will be combined by the Square Root of the Sum of the Squares Method (SRSS). In the absence of acceptable technical justification for the use of the SRSS method, our position is that you should commit to combine dynamic loads by the method of absolute summation until and if the staff concludes that adequate technical justification has been provided for the use of the SRSS method.

RESPONSE

The applicant commits to apply the generic resolution of this issue to the design of Allens Creek. However, for cases where the generic resolution cannot be practically implemented such as steel plate structures within the containment boundary the applicant will justify the acceptability of the design to the satisfaction of the NRC Staff.

For each such case construction or installation will not be initiated until NRC staff approval of the justification has been requested.

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N110.6(3)

ACNGS-PSAR

Open Item No.

361.5 In Section 9.2.5.3.2 of the PSAR you state, "In the event that the rate of sediment accumulation is such that it appears that the allowable level of accumulation will be exceeded during the life of the plant, the sediment will be removed before that allowable limit is reached." In addition to level of sediment accumulation, limits on slope of the surface of the accumulated sediments should be considered to assure that unacceptable consequences will not result from sediment flow into pump intake during design basis events. State the allowable configurations for accumulated sediments within the cooling lake and provide a preliminary description of the technical specifications that will be used to assure maintenance of acceptable sediment configurations. Include criteria, procedures, and technical specifications for maintaining sediment configurations.

RESPONSE

mm  
1 MR. MOON: The next item is equipment for limiting  
2 consequences of transients.

3 Again I believe Bob Tedesco can address a Staff  
4 position on this matter.

5 MR. TEDESCO: Okay.

6 We have most recently addressed an issue on the  
7 plants for the interim operating license, and the action we  
8 have taken here was to implemet certain tech spec requirements.

9 And at this stage of review on Allens Creek, we  
10 would anticipate a similar approach that the operating  
11 license review stage we establish appropriate technical  
12 specification limits on those items of equipment that we  
13 found necessary to limit the consequences of certain transients.

14 MR. WHITE: Okay.

15 As we understand it, you require nothing of us in  
16 writing for the PSAR, nor are we to make any commitment to that  
17 at this time. That is going to be addressed in the SER by the  
18 Staff.

19 Or, do you need a PSAR page from us?

20 DR. MATTSON: I don't think we need a page, do we  
21 Bob?

22 MR. TEDESCO: Not at this point. It is mostly in  
23 our house.

24 MR. VARGA: Bob, what that means at the FSAR stage  
25 we will require whatever appropriate tech spec amendments

mm

1 are required. We won't have to put in anything right now on  
2 that.

3 MR. TEDESCO: I see no need.

4 DR. MATTSON: We will acknowledge in our SER,  
5 however, that we will anticipate in the tech specing, some  
6 of this equipment at the OL stage.

7 MR. TEDESCO: Right.

8 MR. WHITE: We understand.

9 MR. MOON: The next item is anticipated transients  
10 without scram.

11 Again, I think, Bob Tedesco?

12 MR. TEDESCO: Yes.

13 We are all aware of it. We are developing a  
14 position on this whole subject with ATWS. And it has been  
15 expressed in NUREG 0460. And we would apply the same position  
16 we took on Black Fox to Allens Creek on this matter. Namely,  
17 that the design would not preclude the implementation of the  
18 section as necessary.

19 MR. WHITE: Okay.

20 What we would propose in this amendment is the  
21 following words: We are to say that the Applicant will  
22 adopt the resolution for Allens Creek Nuclear Generating  
23 Station.

24 The Applicant reserves the right to provide  
25 acceptable alternative at a later date.

1 That's already in the SER. And we propose to  
2 add the following words: The Applicant's design will include  
3 the ATWS recirculation pump trip; the Applicant will  
4 assure that provisions are made that will accommodate ATWS  
5 modifications that are proposed by the industry for the BWR-6  
6 in the construction stage status of Allens Creek.

7 DR. MATTSON: That's not acceptable, I don't think,  
8 if I understand the words.

9 What we require is that you save space and wait  
10 for the generic resolution in the same vein that we required  
11 of the Black Fox Applicant several months ago. And your use  
12 of the words "industry position" there I think leaves it too  
13 unclear.

14 The industry position, or even the General Electric  
15 position are not clear on any record I am aware of.

16 MR. WHITE: Okay.

17 DR. MATTSON: Let me talk for a minute.

18 What might be easier is for us to give you the  
19 testimony that the Staff presented at the Black Fox hearings  
20 wherein we wrote the requirement for Black Fox, to give that  
21 to you in the form of a question or a Staff position and ask  
22 you to respond to it.

23 And we would expect your response to be similar  
24 to the response we obtained from Public Service of Oklahoma.

25 MR. NEWMAN: May we talk for just a second?

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1 DR. MATTSON: Yes.

2 (Discussion off the record.)

3 MR. WHITE: I think it needs a solution.

4 We are willing to say NUREG 0460.

5 DR. MATTSON: We didn't say it quite that way. That  
6 is the difficulty.

7 MR. WHITE: We would like to get the wording settled  
8 today. And we can change the amendment. This is only proposed.

9 DR. MATTSON: Yes, we should get it settled today.

10 MR. WHITE: We are committing to what you require.

11 DR. MATTSON: Why don't you go on with your issue,  
12 and Steve, could you call Ashok Thadani and ask him to bring  
13 down a copy of the Black Fox testimony?

14 MR. MOON: The next item is --

15 MR. BOYD: Are we going back to this then once we  
16 have it?

17 MR. WHITE: We would like to.

18 MR. BOYD: Okay.

19 DR. MATTSON: Yes, we will come back to this issue.

20 MR. MOON: The next issue is the reactor coolant  
21 system leakage.

22 We have now completed the review of the information  
23 the Applicants provided, we consider it is acceptable and simply  
24 a matter of addressing it in the SER.

25 Bob, do you have anything?

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1 MR. TEDESCO: No, that's right.

2 MR. WHITE: We understand there is nothing required  
3 of us?

4 MR. MOON: Nothing required of you.

5 The next item is two-loop test apparatus.

6 It is my understanding there are test data that  
7 the Staff is looking at. It is my understanding that this  
8 issue will be closed by the words that we put in the second  
9 supplement to the Safety Evaluation Report, and that we do not  
10 require anything from the Applicant at this time.

11 MR. WHITE: That is our understanding also.

12 MR. MOON: Is that right, Bob?

13 MR. TEDESCO: That's the way we are right now. It  
14 is an open issue right now. It is open.

15 MR. VASSALLO: It is open. How do you say it is  
16 closed?

17 MR. TEDESCO: We will write up something in the  
18 SER indicating the status of the review item. It is an open  
19 item.

20 MR. VASSALLO: Right.

21 MR. TEDESCO: There is nothing they owe us. They  
22 can't give me anything right now.

23 MR. VASSALLO: There is nothing they owe us, but  
24 it is our ballpark, it is our job to write up our position.

25 MR. ROSS: Can I inquire for a minute here?

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1                   Certainly it is the Staff's job, but in a process  
2 such as a hearing, I think it would be fair to ask Houston  
3 Power & Light if they are aware of the tests, and if they  
4 understand its possible significance to their ECC performance?

5                   Let me ask you now, are you aware of the tests?

6                   MR. WHITE: We are aware of the tests, we have  
7 discussed with General Electric what their feelings are and  
8 some of the results.

9                   We have not done an impact analysis or anything like  
10 that.

11                   MR. ROSS: The Staff has a certain burden, but I  
12 don't think it shares it unilaterally, and I think it is  
13 certainly reasonable to ask people like you, what have you  
14 done to assure yourself that your model is still in conformance,  
15 if anything?

16                   And I think the record on your side is probably  
17 blank. I don't think by the end of the hearing it can stay  
18 blank. I think you need some burden.

19                   DR. MATTSON: I think that is fair.

20                   But I still think it doesn't change the facts of  
21 the situation today, which is that General Electric has  
22 presented certain information to the Staff, we have certain  
23 requirements that we placed on General Electric to provide  
24 further information, and that we expect to resolve this issue  
25 as a generic matter within the next several weeks, and that

1 we will write a description of that resolution in the Safety  
2 Evaluation Report for Allens Creek.

3 And if it is an interim approach of one sort or  
4 another, then I suspect it would be a subject of interest to  
5 your hearing board.

6 If it is a closed matter, it may still be of  
7 interest to your hearing board. But probably not of such  
8 high interest.

9 MR. TEDESCO: We can't forecast the outcome right  
10 now. It may be a no-nevermind. It may require modification  
11 to operation. I have no idea.

12 DR. MATTSON: The worst we could imagine at this  
13 point is some sort of reanalysis by Allens Creek for this  
14 plant before we issue a construction permit.

15 The other end of the spectrum, it is possible to  
16 reach a generic finding on the significance of the tool and  
17 test apparatus data, and have the Staff close it out without  
18 need for further analysis on your part.

19 MR. WHITE: Well, General Electric in our  
20 discussions has indicated that they see no need at this  
21 time to do any reanalysis, that they are discussing it with  
22 you and the Staff, and if it is necessary at a future time,  
23 Allens Creek can review it.

24 MR. SUMPTER: What is the schedule for review  
25 relative to the January 8th date?

1 MR. ROSS: Did you hear that, Bob?

2 MR. TEDESCO: I'm sorry, I didn't hear that.

3 MR. SUMPSTER: What is your schedule for review  
4 relative to the January 8 date on this issue?

5 MR. TEDESCO: For what, your SER?

6 MR. SUMPSTER: Yes.

7 MR. TEDESCO: We are not likely to have it done,  
8 although we are working on it now.

9 We have five plants backed up, yours, Black Fox  
10 and three operating plants, so we are going all out to resolve  
11 it. But I can't predict a January 8 date, although I would  
12 have to say it sounds optimistic.

13 DR. MATTSON: But we can say for certain that  
14 our current view of the two-loop test apparatus data will  
15 be in the Safety Evaluation Report when it is issued?

16 MR. TEDESCO: Yes.

17 DR. MATTSON: That means it may be an interim  
18 review, if the work is not completed?

19 MR. TEDESCO: Right.

20 DR. MATTSON: We will not hold up the SER for  
21 this information. When it is ready to go out we will put  
22 in it our then current understanding of this question.

23 MR. BOYD: And that is what we mean by closed. It  
24 is closed for purposes of the SER, it is not closed for  
25 purposes of completing our overall review question.

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1 MR. WHITE: That's our understanding.

2 MR. MOON: Bob, are you ready to go back to ATWS  
3 now?

4 MR. TEDESCO: Yes.

5 MR. THADANI: Ashok Thadani, NRC Staff.

6 I am not quite sure what the question was.

7 DR. MATTSON: I told them we required on Allens  
8 Creek, a commitment like the Black Fox commitment.

9 MR. THADANI: That is correct.

10 DR. MATTSON: And the easiest way I knew of to  
11 explain that commitment was to take it directly from the  
12 Black Fox testimony.

13 MR. THADANI: Yes, it is back here. We have this  
14 issue on the Black Fox.

15 The position basically was not to preclude  
16 implementation of NUREG 0460 if that were to be required by  
17 NRC.

18 MR. ROSS: Ashok, do you have an unbound affidavit  
19 that maybe you could just hand to them?

20 MR. THADANI: Yes, I think I could easily get that.

21 DR. MATTSON: Yes. I think what we would want is  
22 an unbound copy of the affidavit. And there is a Section VI of  
23 that affidavit which states the Staff position on Black Fox,  
24 and it is about a page and a half long.

25 And, if we could hand that to you in the course of

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1 the morning, we could put it in the record as being generated  
2 today, and we would look from you before January 8th, to  
3 supply on the record, on the docket, a commitment to the  
4 Staff position.

5 MR. WHITE: Okay.

6 MR. BOYD: Let me modify that with one adjective.  
7 I think it is an adjective. The word is "much," much before  
8 January 8th.

9 MR. WHITE: Right. We would like to go ahead.

10 If you could underline the words that you would  
11 like to see us put in the SAR --

12 MR. SUMPTER: And the Oklahoma response --

13 MR. THADANI: I had a quick look at it. I thought  
14 it was quite good and consistent with what we have been saying.

15 DR. MATTSON: Why don't we give them a copy of our  
16 affidavit for the Black Fox hearing, and a copy of Public  
17 Service Company of Oklahoma's response, and it should be a  
18 matter of your committing to that response.

19 MR. WHITE: Right.

20 At this point we think just which words we want to  
21 put in the SAR to make the commitment -- I think we just need  
22 to know what words are going to be the most satisfactory.

23 MR. THADANI: Fine.

24 Why don't I get you copies of each of the two  
25 documents.

MIN

1 MR. WHITE: Fine.

2 MR. MOON: Okay.

3 The next item is preoperational testing, Regulatory  
4 Guide 1.68.

5 It is my understanding that the Staff will close  
6 this issue by the words in the Safety Evaluation Report  
7 which say that the Regulatory Guide will be used as a guide  
8 for our review of the FSAR.

9 MR. TEDESCO: Right. That's exactly where we are.

10 MR. MOON: Is that okay?

11 MR. SUMPTER: (Nodding affirmatively.)

12 DR. MATTSON: I don't understand, the issue is  
13 closed?

14 MR. MOON: Yes.

15 MR. TEDESCO: Yes, for where we are now.

16 MR. BOYD: For purposes of the CP/SER.

17 MR. WHITE: There is nothing you need from Houston  
18 Power & Light?

19 MR. MOON: No. But we just want you to understand  
20 that we will use the guide during the review of the FSAR.

21 MR. WHITE: Right, we understand that.

22 MR. MOON: All right.

23 The last item then is the emergency core cooling  
24 system.

25 The situation here, as I understand it, the Staff

1 has not quite finished its review.

2 Bob?

3 MR. HANAUER: Is ATWS a misprint on that item?

4 MR. TEDESCO: Yes, on that one.

5 MR. BOYD: As Cal mentioned, when you have something  
6 typed between 7:30 and 8:00 o'clock in the morning, you  
7 sometimes get typographical errors.

8 (Laughter.)

9 MR. TEDESCO: We understand that.

10 Tom, do you want to respond?

11 MR. NOVAK: The outstanding issue with regard to  
12 the emergency core cooling system is the review of the  
13 design provision for converting low pressure core injection  
14 water for a range of small breaks.

15 We are currently reviewing a similar design on the  
16 Black Fox docket. We have had two rounds of additional  
17 questions and we think the information now on the Black Fox  
18 docket is sufficient for us to make a satisfactory decision  
19 on the acceptability of that design.

20 What remains is for Allens Creek to review that  
21 additional information and to reference it as appropriate on  
22 the Allens Creek design.

23 It is our understanding these two designs are  
24 identical in the sense of both being BWR-6s, so we wouldn't  
25 see any additional review except for the fact of you embracing

1 the responses that are already being planned to be put on  
2 the Black Fox docket.

3 MR. WHITE: Okay.

4 I guess on that issue we referenced an earlier  
5 submittal and now you are saying we need to reference  
6 additional --

7 MR. NOVAK: There will be an additional supplement  
8 to the Black Fox docket.

9 We reviewed draft responses to our additional  
10 questions. They are satisfactory. They are being planned to  
11 be put on the Black Fox docket very shortly.

12 I would suggest you also amend your application to  
13 include just all of the additional information.

14 MR. WHITE: Okay.

15 I guess as we understand, the Black Fox stuff  
16 should have been coming in today or yesterday?

17 MR. NOVAK: That's my understanding.

18 MR. WHITE: We can find that out and we can revise  
19 the page probably by tomorrow. If that is all you are saying  
20 is just reference the December 19th, or whatever the date is.

21 MR. NOVAK: You reference your additional information  
22 provided on the Black Fox docket as being appropriate to your  
23 design.

24 As regard to LPCI diversion, that would be an  
25 acceptable response. The additional information does not have

mm  
1 to be placed word for word on your docket. By reference it  
2 would be acceptable.

3 MR. WHITE: Right.

4 And I was curious as to what your schedule is for  
5 review of the Black Fox?

6 MR. NOVAK: We are hoping to complete your review  
7 the early part of January.

8 We have additional supplemental information to  
9 provide on the docket, so I would assume we would be complete  
10 by the middle of January.

11 DR. MATTSON: We have got a deadline for SER input  
12 on this case by January 8th.

13 MR. NOVAK: We can make that date.

14 MR. TEDESCO: Roger, is that issue out of here or from us to —

15 DR. MATTSON: That is from us to the project  
16 manager. It goes to ELD on the 15th. Okay? So within that  
17 window we will make it, because it should be a very simple  
18 thing to incorporate it in your SER.

19 If you can incorporate the Black Fox thing by  
20 reference, it is likely we will incorporate it in the SER  
21 by reference also.

22 MR. RICHARDS: General Electric has indicated  
23 that that additional information is applicable to Allens  
24 Creek, so it won't be a problem, I'm sure of that.

25 MR. WHITE: We understand it has gone into your

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1 statement. We will change the SAR to reflect reference.

2 MR. NEWMAN: Could I just talk to Steve off the  
3 record for a moment?

4 MR. BOYD: Lawyers may always talk to themselves  
5 off the record.

6 (Discussion off the record.)

7 DR. MATTSON: I don't know why this can't be on  
8 the record. Let's go back on the record.

9 The question is whether or not the additional  
10 information coming in on the Black Fox docket can be simply  
11 incorporated by reference on the Allens Creek docket.

12 That has been a rather traditional Staff approach  
13 when information was coming in at the tail end of a review.  
14 The technical staff has no difficulty doing that. If the  
15 lawyers would rather see the information incorporated in its  
16 entirety on the docket, it is purely a matter of paperwork.  
17 I don't see any reason that that paperwork can't be put on the  
18 docket and our paperwork put on the docket for Allens creek  
19 before the January 8th deadline. You may have to fly the  
20 paper across the country, but if the lawyers would rather  
21 see it that way, that is perfectly all right.

22 MR. SUMPTER: I think then you would have to  
23 review to see that the paper was exactly a duplicate of what  
24 was on Black Fox.

25 DR. MATTSON: I think we could probably do that in a

1 couple of minutes.

2 MR. BOYD: The underlying question is what sort of  
3 volume are we talking about?

4 The incoming is how many pages?

5 MR. NOVAK: Just a few pages. It is not that much  
6 new material. It is clarification.

7 MR. BOYD: And the SER input is a page sort of thing?

8 MR. NOVAK: Yes.

9 MR. BOYD: It sounds very reasonable.

10 MR. TEDESCO: Okay.

11 MR. MOON: Okay.

12 Are there any other questions or comments in the  
13 area of reactor safety?

14 MR. SUMPTER: Yes.

15 We have reviewed with the PSO people and General  
16 Electric what they plan to submit.

17 We agree with it and we will submit it identically  
18 on Allens Creek.

19 MR. BOYD: I'm sorry. Which point was this?

20 MR. SUMPTER: We have reviewed with PSO and plan  
21 to submit -- them and the General Electric people -- and we  
22 agree with it, and on this LPCI issue we will submit an identi-  
23 cal copy.

24 MR. MOON: Okay.

25 Any other questions in Bob Tedesco's area here?

mm 1 He has to go on to another meeting.

2 MR. WHITE: The only thing I would like to say is  
3 that Lonnie here is probably going to get the amendment out  
4 or get the page out, call the Oklahoma people, find out what  
5 the date is on it, and we will probably have the words later  
6 this morning say, you know, we incorporate the latest submittal  
7 as long as it has gone in on Black Fox.

8 MR. TEDESCO: The only areas we are dealing with  
9 now are ATWS and this ECCS one, right?

10 MR. WHITE: Right. We still need your --

11 MR. TEDESCO: Yes. Those two issues need to be  
12 resolved.

13 MR. BOYD: Except, Bob, that we still need some  
14 individual inputs on these other matters which, naturally,  
15 you are going to have to us by the 8th.

16 MR. TEDESCO: Yes.

17 MR. BOYD: Appreciate it.

18 MR. WHITE: Can we take this opportunity to have a  
19 little bit of a caucus?

20 DR. MATTSON: Sure.

21 (Recess.)

22 MR. MOON: Are we ready to go?

23 We will go now to the plant systems area. The  
24 first item there is testing of the ultimate heat sink. The  
25 Staff's review is complete based on the information you have

1 provided us and this issue is closed.

2 The next item had to do with load shedding.

3 This issue is also closed. We have completed our review.

4 MR.CHOPRA. Which one.

5 MR. MOON: Load shedding.

6 MR. HANAUER: This is Am Chopra, C-h-o-p-r-a of  
7 the Power Systems Branch.

8 I am Steve Hanauer, Assistant Director for Plant  
9 Systems.

10 MR. WHITE: I want to say that the commitment we  
11 got in the PSAR is correct.

12 MR. MOON: That is correct, isn't it, Om?

13 MR.CHOPRA: Yes.

14 MR. MOON: The last two items I will ask Dr. Hanauer  
15 and Om to address.

16 The first one is design of the load sequencer and  
17 then under voltage protection.

18 MR. CHOPRA: Yes, the second is under voltage protec-  
19 tion.

20 I believe I sent you our position on that, and  
21 response to our position, what your design date was. Instead  
22 of adding three separate relays, they added one additional relay  
23 at a higher percentage level. That will simply alarm. Instead  
24 of having a function of logic of two out of three, or three out  
25 of four they would have only one relay.

1 I believe we told them that that would be  
2 unacceptable because we required the constant logic and  
3 those relays should pick up and separate the onsite power --  
4 offsite power on the onsite busses.

5 MR. WHITE: Okay.

6 What we would propose is that we be allowed to  
7 pursue either one of two paths:

8 The first path is to maintain our one set of  
9 coincident logic that would trip a certain voltage level and  
10 everything in the plant would be designed to withstand under  
11 voltage situations in that level. Because as we understand  
12 the Staff concern is related to the Millstone incident?

13 MR. CHOPRA: Yes, that's correct.

14 MR. WHITE: Which certain portions of their equipment  
15 were not designed for long-term under voltage situations.

16 So we would propose that we either design the plant  
17 for these long-term under voltage situations down to this  
18 limit, or we would trip with coincident logic.

19 Either pursue that pathway or pursue the Staff  
20 position of having essentially two sets of redundant coincident  
21 logic for different levels. One with a time delay.

22 MR. HANAUER: What does either/or mean in the context  
23 of January 8th?

24 MR. WHITE: Well, what we would like today is a  
25 decision from the Staff as to whether, if we are addressing the

mm 1 concern -- the basic concern with either of those two approaches.

2 MR. HANAUER: I don't understand either.

3 You are proposing -- what we have in writing on

4 the docket is not satisfactory.

5 MR. WHITE: Right. We are willing to change what we

6 have on the docket to say we will either --

7 MR. HANAUER: You want to say on the docket you will

8 do either one or the other.

9 MR. WHITE: Right.

10 MR. SUMPTER: No. We propose to you right now two

11 different ways to solve the problem.

12 We would like for you to tell us which one you

13 prefer.

14 MR. HANAUER: Well, gee, instant analysis is not

15 our strong point.

16 Obviously the second one is satisfactory, it is to

17 do what the Staff said.

18 The first one we would have to see and consider.

19 When could you get something to us?

20 I don't like this last-minute stuff, but you know,

21 that is your --

22 MR. WHITE: Okay.

23 I guess -- can you give us an opinion at this time

24 whether it would be worthwhile for us to pursue the first one

25 at some later date?

1 DR. MATTSON: Describe the first one a little bit to  
2 me.

3 MR. WHITE: Okay, sir.

4 We felt that the basic concern was over the  
5 Millstone incident where certain portions of the plant were  
6 not designed to take under voltage for a sustained period of  
7 time.

8 MR. HANAUER: Couldn't pick up, in particular. And  
9 that they burned out because of the sustained undervoltage.  
10 But in particular, they couldn't pick up and go.

11 MR. WHITE: Okay.

12 Our electrical engineering staff feels that the  
13 design of the Allens Creek plant is different from that of  
14 Millstone such that a similar incident could not occur at  
15 Allens Creek if we had a sustained under voltage, somewhere  
16 between 100 percent voltage down to the limit where we already  
17 have the coincident logic tripping.

18 What we would propose is that we either design the  
19 plant to withstand sustained under voltage down to a certain  
20 limit. I am not talking about -- I am talking about all  
21 different things in the plant.

22 Or, we would go with the Staff position of having  
23 two sets of redundant coincident logic.

24 And what we are saying is that if at this meeting  
25 today you are saying that it is too early to give us a decision

mm  
1 on the first one, we would like to have an indication of  
2 whether it is worthwhile pursuing it with you at a later date.

3 We are willing to commit to the Staff position  
4 at this time, and pursue it later if you think it is worth-  
5 while.

6 We feel either way addresses the basic concern.

7 MR. CHOPRA: I think the second one is easier for  
8 you to do rather than the first one. Instead of designing the  
9 whole system to bear the sustained voltage, it would be  
10 easier for you to just simply add some more relays.

11 MR. WHITE: Okay.

12 MR. CHOPRA: You have to buy all those motors that  
13 can start on a low voltage.

14 MR. RICHARDS: I believe we have done so.

15 MR. WHITE: Okay.

16 Let the record show then we will commit to the  
17 Staff position. We will have the words in the amendment that  
18 will essentially commit to the Staff position that was provided  
19 in the November 7th letter.

20 DR. MATTSON: We have had a fair amount of experience  
21 in this area, and I don't think it is off the cuff that we  
22 would discourage you from going with the first one. I think it  
23 -- the Staff position in this regard is being applied to  
24 all the reactors in this country, and it has not been one that  
25 was promulgated without a lot of thought going into it.

mm

1           MR. WHITE: We realize that. And we are willing to  
2 take steps to commit to the Staff's position.

3           So Amendment 49, which will be coming in probably  
4 this Friday, will have that commitment in it.

5           If we put that commitment in, that should resolve  
6 the situation.

7           MR. HANAUER: That would resolve it.

8           MR. CHOPRA: Yes, that would.

9           MR. MOON: Okay. On the load sequencers --

10          MR. BOYD: And we can get the writeup then  
11 appropriate on as many times-- they bring the thing in, it is  
12 a simple matter once they have the thing laid on?

13          MR. CHOPRA: Yes.

14          MR. WHITE: We will probably take the approach that  
15 we will probably take the question and revise the answer to the  
16 words that were in the question and say, "The Applicant will  
17 provide. . ."

18          MR. HANAUER: That will be fine.

19          DR. MATTSON: Let's interrupt the flow here for a  
20 minute. Mr. Thadani is back with his affidavit in the Black  
21 Fox hearing, and affidavits by a Dr. John Zink of Public  
22 Service Company of Oklahoma, two of them.

23                 Ashok, do you want to explain why there are two  
24 affidavits from Dr. Zink?

25          MR. THADANI: Yes.

mm 1           The first one basically committed to installing  
2 the full design modifications that we identified in our  
3 testimony, if they were to be required.

4           (Handing documents to Messrs. White and Sumpter)

5           There was some question as to the recirculation  
6 pump trip design, that the Applicant -- in this case John Zink --  
7 had described in his earlier testimony. So there was a need for  
8 subsequent or rebuttal testimony to point out the type of  
9 recirculation pump trip they intended to implement at the  
10 Black Fox station.

11           Just quickly to indicate, they made two types of  
12 commitments. One was that they would not preclude implementing  
13 design modifications identified in our testimony. Two, they  
14 would implement whatever generic resolution NRC arrived at on  
15 ATWS.

16           DR. MATTSON: There is one other piece of paper  
17 we could probably offer these people today, to help their  
18 understanding of this issue, and that is the Staff Report that  
19 was issued yesterday, Volume 3 to NUREG 0460, which describes  
20 in some detail the Staff recommendation on specific hardware  
21 for several classes of facilities, one of which covers the  
22 Allens Creek facility.

23           If that would help you to context this specific  
24 requirement with the requirements that the Staff was  
25 recommending for all nuclear power plants, that is available.

mm  
1 We can get you a copy of that, too.

2 I caution you, that it is a document about an inch  
3 thick. Don't try to read it and understand it today. you  
4 probably can't.

5 MR. SUMPTER: You don't mean for us to commit to all  
6 four of the proposed modifications in 0460 as discussed in his  
7 testimony?

8 DR. MATTSON: What we want you to commit to is to  
9 not preclude the ability to install all four of those  
10 modifications.

11 MR. WHITE: If we listed the four modifications, would  
12 that be a satisfactory answer?

13 MR. THADANI: And went on to say that you assure that  
14 there would be sufficient room left to implement these  
15 modifications if they were required.

16 MR. WHITE: I get back to, again, it is our intent  
17 to commit to. We just want to know what words are that is  
18 going to resolve the issue.

19 We don't want to get into too many, you know, inch-  
20 thick documents, to try and just get the words.

21 DR. MATTSON: Dr. Zink's affidavits are acceptable  
22 to the Staff.

23 MR. WHITE: Okay. Let us take some time to look  
24 at these during the day today. By the time we leave we will  
25 have some words.

1 DR. MATTSON: Good.

2 DR. SUMPTER: Do you want to incorporate this in  
3 today's record, your affidavit?

4 DR. MATTSON: They are a matter of public record  
5 already. I think it is sufficient.

6 MR. BOYD: If it is useful to either or both  
7 groups, we ought to bind those up in there.

8 If it is not particularly useful, I would say not.

9 My guess is that those things are probably useful.  
10 But, for goodness sake, on this supplement 3 or whatever you  
11 call it, let's not try to bind that one up in there. Call it a  
12 source document, or something.

13 MR. HANAUER: It is, for sure, in the public records.  
14 You can buy it.

15 (Laughter.)

16 MR. THADANI: It is only for \$9.

17 (Laughter.)

18 MR. BOYD: The point is, however, you are willing to  
19 give these people a copy for free?

20 DR. MATTSON: Well, there are a few copies available.

21 MR. MOON: Okay.

22 (Documents follow: 1. Testimony of Thadani and/or  
23 Ross, Novak on Contention 65, ATWS Black Fox Station;  
24 Testimony Zink on Contention 67, ATWS, Black Fox  
25 Station; and Rebuttal Testimony Zink concerning  
Contention 65, ATWS, Black Fox Station)

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

PUBLIC SERVICE COMPANY OF OKLAHOMA  
ASSOCIATED ELECTRIC COOPERATIVE, INC.,  
and  
WESTERN FARMERS ELECTRIC COOPERATIVE,  
INC.

(Black Fox Station, Units 1 and 2)

Docket Nos. STN 50-556  
STN 50-557

TESTIMONY OF MR. A. C. THADANI and/or D. F. ROSS, T. M. NOVAK

ON CONTENTION 65, ANTICIPATED TRANSIENTS WITHOUT SCRAM (ATWS)

## Testimony on Anticipated Transients Without Scram (ATWS)

By A. C. Thadani  
D. F. Ross, Jr.  
T. M. Novak

### I. What is ATWS

"ATWS" is an acronym for "Anticipated Transients Without Scram." The first part of ATWS, "Anticipated Transients," is concerned with deviations from normal operating conditions and might occur one or more times during the service life of a plant. The other part of ATWS, "Without Scram," is concerned with the reactor protection system. In the event of an occurrence of an anticipated transient, the control rods (which are part of the reactor protection system) are automatically inserted into the reactor core to shut down the nuclear reaction. This automatic response of the protection system is called the "scram." If, in spite of all the care built into the reactor protection system design, a scram should not result following an anticipated transient, then an ATWS event would have occurred.

### II. Background History

In September 1973, the Atomic Energy Commission Regulatory staff published the "Technical Report on Anticipated Transients Without Scram for Water-Cooled Power Reactors" (WASH-1270) establishing acceptance criteria for anticipated transients without scram (ATWS). These criteria were developed because of the staff belief that a fully satisfactory methodology for analyzing the reliability of protection systems from the standpoint of common mode failures was not available at that time, that elements of these types of failures had occurred in protection systems, and that the potential consequences of some

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\*The Code of Federal Regulations, 10 CFR Part 50 Appendix A defines Anticipated Operational Occurrences as those conditions of operation which are expected to occur one or more times during the life of the nuclear power unit.

postulated anticipated transients without scram are calculated to be hazardous to the public. Subsequent to the publication of WASH-1270, the staff met with the General Electric Company and other reactor vendors on a regular basis and reviewed their evaluation model, the results of analyses of anticipated transients without scram, the diversity of the systems relied upon to mitigate the consequences of ATWS, and the susceptibility of the reactor protection system to common mode failure.

The General Electric Company in conformance with the requirements of Section II-B of Appendix A to WASH-1270 submitted an analysis of anticipated transients without scram, NEDO-20626, and an evaluation of the susceptibility of the reactor protection system to a common mode failure, NEDO-10189.

The NRC staff review of General Electric ATWS analyses included the anticipated transients expected to occur, the initial conditions and system parameters assumed in the analyses, the reliability of systems, analytical techniques, the results of analyses of ATWS, and the design of the reactor protection system. Using the requirements of WASH-1270 as a guideline, the staff reviewed each relevant aspect of the General Electric model and analysis. The details of the staff review are provided in the "Status Report on General Electric Analyses of Anticipated Transients Without Scram," December 9, 1975.

The staff status report identified fourteen outstanding issues which required that General Electric or the applicant provide additional information.

Since the publication of the 1975 status reports, additional information relevant to ATWS has been developed by the industry and the Reactor Safety Study Group. General Electric has submitted additional ATWS analyses\* and a detailed reliability analysis of the BWR reactor protection system.\*\*

Based on review of these reports and discussions with General Electric Company and others, the NRC Division of Systems Safety has published a report on "Anticipated Transients Without Scram for Light-Water Reactors," NUREG-0460, April 1978.

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\*General Electric ATWS Report, June 30, 1976.

\*\*General Electric BWR Scram System Reliability Analysis, September 30, 1976.

NUREG-0460 concludes that features to mitigate consequences of ATWS events are needed. In view of the differing opinions on ATWS, a recommendation is made in NUREG-0460 that an ATWS rulemaking be initiated. That proposal is currently under review by the Office of Nuclear Reactor Regulation and the Advisory Committee on Reactor Safeguards. If the current staff proposal leads to initiation of rulemaking by the Commission, any rule adopted would include an implementation plan for all classes of plants. The GESSAR class of plants would be required to provide plant modifications in conformance with ATWS criteria and schedular requirements provided in the rule. The following section summarizes the major conclusions in NUREG-0460 which will be considered for the Black Fox Stations 1 and 2. The staff position specifically for Black Fox is in Section VI.

### III. NUREG-0460 Considerations

#### A. Significance of ATWS Events

Because of the perceived potential for serious consequences resulting from ATWS events, a number of studies have been undertaken to assess the probabilities and consequences of such events. These studies have been performed by vendors, utility groups (i.e., Electric Power Research Institute), as part of the Reactor Safety Study (WASH-1400), and by the AEC and NRC regulatory staff.

In a boiling water reactor, the anticipated transients which require prompt action to shut down the reactor in order to avoid plant damage and possible offsite effects can be classified in two groups: those that isolate the reactor from the heat sink and those that do not. (A list of these transients is included in Appendix IV of NUREG-0460.) In general, the consequences of both of these types of events are an increase in reactor power or system pressure or both. However, the reactor control and protection systems are designed to monitor plant parameters which would be affected by these transients and to cause alarms, restrict control rod motion or initiate scram as the occasion may require when off-normal conditions occur. In a BWR, the parameters that are monitored for off-normal conditions and lead to alarms and scram are neutron flux, reactor vessel water level and pressure, containment pressure, main steam line isolation valve and turbine stop valve position, turbine control valve fast closure, condenser low vacuum, main steam line radiation, and scram discharge volume water level. In addition, scram may be manually initiated.

Transients in which the heat removal from the reactor is not greatly affected include transients resulting from abnormal changes in core reactivity or reactor coolant temperature, inventory or flow. Generally, the consequences of these types of transients are not particularly severe even if a scram does not occur. Generally, the reactor reaches a stable condition and could be shut down without damage after an initial period of abnormal but safe operation.

Transients in which the reactor is isolated from the heat sink result in an increase in the reactor primary system pressure and have the greatest potential for significant damage. This type of transient includes a loss of condenser vacuum, turbine and generator trips and a closure of the main steam line isolation valves. The most severe of these is closure of all main steam line isolation valves. The closure of the main steam line isolation valves also results in the interruption of steam flow from the reactor. Closure of either the stop or isolation valves trips position switches and results in a scram signal. This is the normal course of events and the resulting increases in pressure and power are well within design limits. The pressure may exceed the relief valve set point, thus resulting in discharge of steam to the suppression pool, but the vessel pressure will remain below the safety valve set point. The power increase results in a decreased thermal margin, but the critical heat flux limit is not reached, and no fuel damage is predicted to occur.

The pressure and neutron flux increases resulting from the interruption of steam flow will cause additional trip signals. A scram signal will be produced very quickly after valve closure by the rise in neutron flux. If this trip signal, rather than the valve position trip, effects a scram, the reactor pressure will rise above the safety valve set point but still well below the 110 percent of design pressure limit specified for anticipated transients by the ASME Boiler and pressure Vessel Code. A scram signal will also be generated somewhat later by the rise in pressure.

If this trip signal, rather than any of the previous signals, effects a scram, the pressure will still remain below the ASME Code limit. An additional trip signal will be generated by reactor vessel low water level.

However, if the control rods were to fail to insert following transients that isolate the reactor from the normal cooling systems, the resulting pressure rise could be large enough to threaten the integrity of the reactor coolant pressure boundary, which includes the reactor pressure vessel and connected piping and components. Even if the pressure rise is limited, unless the power and system pressure were reduced to within the capacity of the standby cooling and makeup systems within a few minutes, the core could be uncovered and melting could occur. During this time the energy generated in the core would be transmitted to the containment through safety/relief valves and it would also be necessary that the containment suppression pool temperature limit, established to assure containment integrity, not be exceeded.

#### B. Frequency of ATWS Events

The frequency of ATWS events is the product of the frequency of anticipated transients and the conditional probability of scram failure given the occurrence of a transient. It is concluded in NUREG-0460 that anticipated transients that would result in significant consequences if not controlled by a reactor scram could be expected to occur at a rate of approximately six per reactor year. It is also estimated in the report that the probability of rods failing to insert on demand is approximately  $3 \times 10^{-5}$ . Based on these estimates the report concludes that the frequency of an ATWS event with potential for severe consequences is about  $2 \times 10^{-4}$  per reactor year. The staff recognized that because of lack of data, the scram failure probability estimate may be uncertain by a factor of 5

#### C. Safety Objective

Section 5 of NUREG-0460, Volume 1, provides the rationale for specification of a safety objective for ATWS and concludes that a value of  $10^{-6}$  per

reactor year of exceeding conservative ATWS criteria can be used as an aiming point in establishing whether design modifications are required. The staff has concluded in NUREG-0460 that there is a need for ATWS mitigation systems since the estimated frequency of ATWS is greater than the desired safety objective.

#### IV. Contention on Black Fox

In the material on very large accidents set forth by the intervenors and evaluated by the Board to determine if this material could be admitted, the Board concluded that unless the potential occurrence of such events passes some test of "credibility", these events need not be considered. The Board used the test of credibility to reject some contentions such as control rod ejection with failure to scram.

The Board has admitted contentions 5, 8, 9, 11, and 14 on the basis that ATWS had already been assumed as credible. The staff believes that most of these contentions fall outside ATWS considerations and are beyond the threshold of credibility.

Contention #5. Steam valve closure transients without scram are appropriate ATWS events and are further discussed later in this testimony.

#5a. Within the framework of NUREG-0460, ATWS with failure to trip recirculation pumps is inappropriate for consideration because reliable means of tripping these pumps are a design requirement for this plant. Thus the frequency of this sequence of events is believed to be low enough that it need not be considered. These items are further discussed in Section V below.

#5b. With the exception of recirculation pump trip failure (5a above), these issues are appropriate for ATWS consideration.

Contention #8. A main coolant pipe rupture without scram is inappropriate for consideration because a main coolant pipe rupture is not an anticipated transient. A main coolant pipe rupture is an "accident" which has a much lower likelihood of occurrence than an "anticipated transient." the frequency of a main coolant pipe rupture followed by failure to scram

is estimated to be negligible (less than  $10^{-7}$  per reactor year). This sequence would therefore be beyond the threshold of credibility.

Contention #9. A rupture of main steam pipe without scram is inappropriate for consideration for the reasons cited above in the staff's response to Contention #8.

Contention #11. Like pipe ruptures, the likelihood of blockage of coolant flow is much lower than anticipated transients and inappropriate for consideration with ATWS for the reasons cited under response to Contention #8.

Contention #14. Like pipe ruptures, the likelihood of massive fuel crumbling in a local region of the core is much lower than anticipated transients and inappropriate for consideration with ATWS for the reasons cited under response to contention #8.

#### V. Impact on Black Fox

Since the frequency of severe ATWS consequences exceeds the safety objective, some corrective measures to mitigate the consequences of ATWS events should be provided for this plant. NUREG-0460 considered a variety of ATWS scenarios, including different initiating events and different combinations of equipment availability. As an example, a representative initiating event is turbine stop valve closure and a representative postulated equipment outage is failure of the high pressure core spray system.

In a letter dated May 25, 1976 from NRC to Public Service Company of Oklahoma, the staff required that PSCO provide analyses of ATWS events and identify the design changes that may be needed to satisfy ATWS criteria. In response to this request, PSCO referenced, in a letter dated September 30, 1976, the "General Electric ATWS Report", June 30, 1976 as containing analyses applicable to the Black Fox Station.

The analyses were performed using the following groundrules:

- (1) ATWS event occurs
- (2) Separately consider the failure of
  - (a) high pressure core spray system
  - (b) some safety valves to reclose
  - (c) single train of RHR

- (3) No operator action for at least 10 minutes
- (4) Credit can be taken for systems which have acceptably high reliability.

The above referenced GE analyses for BWR/6 class of reactors show that the acceptance limits (Appendix IV, NUREG-0460) would not be exceeded as a consequence of the postulated ATWS scenarios if the following design modifications are all implemented.

#### 1. Recirculation Pump Trip (RPT)

Since scram is assumed unavailable for reducing the power output of the reactor in an ATWS and since the transient event is assumed to be one in which power reduction is necessary, another method of reducing the power would be needed. Tripping the recirculation pumps would reduce core flow. As core flow is reduced, the amount of voids would be increased and thus core power would be reduced. This action would be quickly effective in reducing the steam generation rate. Core flow would be then driven by the natural circulation head.

#### 2. Feedwater Pump Trip (FPT)

Stopping feedwater flow and allowing the high pressure coolant injection systems to operate would provide reduction of the natural circulation head and a further reduction of steam generation. As was previously noted under 1, following recirculation pump trip the core flow would be driven by the natural circulation head. Reduction of this flow will enable further reduction of power. During vessel pressurization transients, the feedwater system will tend to control the level at its normal position.

For transients in which the main steam isolation valves close early in the transient, steam-driven main feed pumps are tripped due to lack of steam. For transients such as generator trips, motor-driven feed pumps must be electrically tripped by the FPT.

### 3. Standby Liquid Control System (SLCS)

In the event that normal rod insertion is unavailable for shutting down the reactor, the General Electric BWRs have another method of inserting neutron absorbing material. This is known as the Standby Liquid Control System. This system can inject an aqueous solution of sodium pentaborate into the reactor coolant. When the boron concentration in the reactor coolant reaches approximately 165 parts per million, the reactivity is reduced sufficiently to bring the core to hot standby. The pumps continue to inject the sodium pentaborate solution until sufficient boron is in the core to bring it to cold shutdown. In order to meet the recommended criteria of NUREG-0460 the SLCS would need to be automated and the rate of reactivity change would need to be increased. If the SLCS is modified to significantly increase the rate of reactivity change either HPCS or RCIC apparently can keep the core covered in a postulated ATWS.

### 4. High Pressure Core Spray System (HPCS)

The High Pressure Core Spray System and Reactor Core Isolation Cooling System would be used to supply water to the vessel in the improbable case that an ATWS has occurred. Their flow would be sufficient to cool the core and maintain a lower natural circulation head; therefore, power would be reduced. Because 1135 psig is reached during some normal scram conditions, these high pressure systems should be only initiated following confirmation that rods have not been inserted on the high pressure signal. They are initiated immediately on the low water signal in the current design. In the event HPCS fails to function on demand, an alternative high pressure makeup system other than RCIC would be needed to keep the core covered unless the Standby Liquid Control System is modified as discussed above in item 3.

Assuming the modifications 1-4 have been implemented, thus the availability of RPT, FPT, and modified SLCS, GE analyses (see attached table) show that the worst case ATWS event satisfies the ATWS criteria of NUREG-0460.

TABLE 1

## Results of ATWS Analyses

Transient	Peak Dome Pressure (psig)	Peak Containment Pressure (psig)	Peak Pool Temperature (°F)
MSIV Closure	1322	<5.9	128
MSIV Closure with S/V stuck open	1322	5.9	149
Loss of Normal AC	1190	4.2	133
inadvertent Opening of Safety Valves	1040	3.4	125
Limits	1500	15	190

## Black Fox Safety Evaluation Report

In the safety evaluation report related to construction of Black Fox Station Units 1 and 2, the staff concluded that any changes that were necessary for ATWS should be incorporated in the GESSAR-238 design in a timely manner.

### Public Service Company of Oklahoma Contention

Public Service Company of Oklahoma, in a letter dated September 30, 1976, to the director of NRR urged that the ATWS issue be resolved on reliability considerations of the protective system and referenced the September 30, 1976 General Electric report on "BWR Scram System Reliability Analysis" and the Electric Power Research Institute (EPRI) study, "An Examination and Analysis of WASH-1270, Technical Report on ATWS Report for Water Cooled Power Reactors," dated June 1975. The basic conclusion of these studies and other subsequent EPRI studies is that the frequency of serious ATWS events is acceptably low.

### Staff Response

The review of the reports referenced in the PSCO September 30, 1976 letter is discussed in Appendix II of NUREG-0460, Volume 2. The report disagrees with the conclusions of these industry studies and recommends that measures to mitigate consequences of ATWS events be provided.

## VI. Staff Position on Black Fox

The staff requires a commitment to provide an ATWS solution. This requirement should be considered in context with the NRC's planned deliberations on the need, generally, for ATWS provisions. The recent sequence of actions within the NRC is:

- (1) In April 1978 the report NUREG-0460 on ATWS, by the Division of Systems Safety of NRR, was published. The recommendations included design criteria for plants such as Black Fox, and recommended rule making to establish such criteria.
- (2) The report, at present (Sept. 1978), is under review by the Advisory Committee on Reactor Safeguards and the Office of Nuclear Reactor Regulation. After completion of the review, now estimated by January, 1979, the Office Director, NRR, will forward his recommendations to the Commission.
- (3) After deliberation, the Commission will act on the matter. Whether it will agree to rule making is speculative at this time. If rule making is initiated by the Commission, we would expect that any rule adopted would include an implementation plan for all classes of plants. The GESSAR class of plants would be required to provide plant modifications in conformance with ATWS criteria and scheduler requirements provided in the rule.

Although these deliberations are ongoing (we are at Step 2 at this writing in Sept. 1978), we are concerned that the Black Fox Station design might proceed over the coming months so as to preclude full implementation of the design modifications to satisfy acceptance criteria in NUREG-0460 should they eventually be adopted by the Commission, either with or without rule making.

Therefore, the NRC staff believes that the applicant should commit that the Black Fox Station design and construction will not preclude implementing

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Therefore, the NRC staff believes that the applicant should commit that the Black Fox Station design and construction will not preclude implementing

modifications necessary for ATWS. The type of design modifications that may be required to satisfy NUREG-0460 criteria are described on pages 65-8 and 65-9. A review of those potential modifications suggests that the majority of these changes would impact electrical actuation portions of systems currently available on the Black Fox Station Units 1 and 2. Some of the changes in the standby liquid control system would also require higher capacity pumps and different injection points. It is our belief that these changes, if required, can be accommodated late in the construction process without major change in other safety systems and structures. Thus, these items can be left for review during the FSAR stage. However, it is important that applicant answers that the construction process does not inadvertently restrict the ability to make these modifications.

A. TELADONI

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

PUBLIC SERVICE COMPANY OF OKLAHOMA,  
ASSOCIATED ELECTRIC COOPERATIVE, INC.,  
AND WESTERN FARMERS ELECTRIC  
COOPERATIVE, INC.

)  
)  
) Docket Nos. STN 50-556  
) STN 50-557  
)  
)

(Black Fox Station, Units 1 and 2)

Testimony of Dr. John C. Zink

Concerning Contention 67

(Anticipated Transients Without Scram)

September 25, 1978

TESTIMONY OF DR. JOHN C. ZINK  
CONCERNING CONTENTION 67\*  
(ANTICIPATED TRANSIENTS WITHOUT SCRAM)

My name is John C. Zink and I reside at 12518 E. 134th Street, Broken Arrow, Oklahoma. I became an employee of the Public Service Company of Oklahoma in 1975 when I was assigned to the Black Fox Station Nuclear Power Project as Supervisor of Nuclear Engineering. On October 1, 1978, I will be promoted to the position of Manager, Nuclear Fuels. Prior to my employment with the Public Service Company of Oklahoma, I was an Assistant Professor of Nuclear Engineering at the University of Oklahoma from 1970 to 1975. I received B.S. and M.S. degrees in mechanical engineering -- nuclear option from the University of Notre Dame, and I received my Ph.D. in Nuclear Engineering from the same University in 1970. My testimony addresses the manner in which the design of the Black Fox Station has or will account for ATWS remedies advocated by NRC's Division of System Safety.

Public Service Company of Oklahoma has carefully followed the ongoing industry-wide discussions and regulatory activities regarding Anticipated Transients Without Scram (ATWS). I have

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\* Contention 67 reads:

The analysis by the Applicants and the Staff of the facilities' response to certain anticipated transients with simultaneous failure of the scram system (ATWS) have underestimated both the consequences of such events and their likelihood, to such an extent that the facilities present an undue hazard to the health and safety of the public.

a phenomenon unrelated to the ATWS event. For this reason, it has been incorporated to the Black Fox Station.

A high capacity automatic boron injection system, incorporating larger pumping capacity and additional sodium pentaborate solution storage volume, was also considered by DSS in NUREG-0460. Should the ultimate generic resolution of ATWS require the installation of this system, adequate space has been provided in the Black Fox Station to accommodate it.

Thus, of two potential "fixes", one -- the recirculation pump trip feature -- is included in the design of the Black Fox Station, and inclusion of the other -- the high capacity automatic boron injection system -- will not be foreclosed by the construction of Black Fox Station.

HIGH CAPACITY AUTO BORON INJECTION

End. 2

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
 )  
PUBLIC SERVICE COMPANY OF OKLAHOMA, )  
ASSOCIATED ELECTRIC COOPERATIVE, INC., ) Docket Nos. STN 50-556  
AND WESTERN FARMERS ELECTRIC ) STN 50-557  
COOPERATIVE, INC. )  
 )  
(Black Fox Station, Units 1 and 2) )

Rebuttal Testimony of Dr. John C. Zink  
Concerning Contention 65  
(Anticipated Transients Without Scram)

December 10, 1978

REBUTTAL TESTIMONY OF DR. JOHN C. ZINK  
CONCERNING CONTENTION 65  
(ANTICIPATED TRANSIENTS WITHOUT SCRAM)

My name is John C. Zink and I reside at 12518 E. 134th Street, Broken Arrow, Oklahoma and I have testified previously concerning the ATWS contention in this proceeding. In the NRC Staff testimony on Contention 65 (ATWS), Mr. Thadani lists four potential future design modifications that the Applicant must not foreclose during the design and construction of Black Fox Station. In my previous testimony I addressed items 1 and 3 of those four items and indicated that the design of Black Fox Station will not preclude incorporation of these features if they should become requirements as a result of resolution of the generic ATWS issue.

Item 2 of the Staff scenario of modifications that might be required is the Feedwater Pump Trip. Specifically, the requirement is that "for transients such as trips, motor-driven feed pumps must be electrically tripped by the FPT." (Staff testimony page 65-9). This requirement does not address the BFS plant which incorporates turbine driven feed pumps rather than the specified motor driven feed pumps. The Staff does, however, mention steam driven feed pumps when they acknowledge that "For transients in which the main steam isolation valves close early in the transients, steam-driven main feed pumps are tripped due to lack of steam."

(Staff testimony page 65-9). Thus in the case of the most severe ATWS transients, those leading to isolation of the reactor, the BFS turbine-driven feed pumps meet the requirement. Any additional requirement for feed pump trip would be a matter of control logic which, if required, would not be precluded by the construction of BFS as it is currently designed.

The Staff testimony also addressed the need for an alternate high pressure makeup system. Specifically, it is stated that "in the event HPCS fails to function on demand, an alternative high-pressure makeup system other than RCIC would be needed to keep the core covered unless the standby liquid control system is modified as discussed above in item 3." In the "item 3" referenced here, the Staff requires that "in order to meet the recommended criteria of NUREG-0460 the SLCS would need to be automated and the rate of reactivity change would need to be increased." (Staff testimony page 65-10). As I stated in my previous testimony, the BFS design has been established in such a way that an automated high-capacity boron injection system (SLCS) can be accommodated. The high capacity SLCS sufficiently increased the redundancy of high pressure water makeup to the reactor so that the modified SLCS would be capable of meeting both Staff items 3 and 4.

Thus, it is my conclusion that the BFS design does not preclude incorporating the potential design modifications for ATWS mitigation that are specified in the Staff testimony.

1 MR. MOON: Let us return to the question of the  
2 design of load sequencers.

3 MR. CHOPRA: Right.

4 Originally, I don't think they were -- your design  
5 really required sequencing of loads on offsite power. And I  
6 think we were discussing on phone, our first position. And  
7 somehow -- I don't remember the name of the guy -- he said  
8 in your design you will never have a problem like the Millstone  
9 problem because you use sequence loads on the offsite power.

10 That was the first time I ever heard that you were  
11 sequencing loads on offsite power.

12 Now we did that on Palo Verde, they were all done  
13 with sequence. And I would like to know in detail, your  
14 design, how you sequence your loads on offsite power.

15 If you are using a single sequencer for both  
16 onsite as well as offsite or what? I don't know the design.

17 MR. HANAUER: Do you want to discuss the design  
18 around the table, or should we arrange some kind of an  
19 exchange of information?

20 MR. WHITE: I think it would be worthwhile for this  
21 meeting to go ahead and let you know what we can say today  
22 about it, because the problem we have run into, is that we  
23 talked to Palo Verde people about what type of information  
24 they were able to provide, and they were so much further in  
25 the procurement cycle they knew the vendor, they could come up

1 with numbers for their reliable analysis, and those two of  
2 things.

3 You know, we are several years, really, away from  
4 selecting a vendor.

5 We do know that the sequencer for automatic loading  
6 of the safety busses is going to be designed -- it is a  
7 safety-grade equipment, so it is going to be designed to  
8 meet IEEE 323 '74, 344 '75, 279 '71 and all the other, you  
9 know, standard safety grade standards.

10 The next thing we are going to incorporate the  
11 most feasible technology that is going to be available, which  
12 is probably going to mean it is going to be electronics.

13 But again, we haven't chosen the vendor, so, you know,  
14 it is just one of those things where we can't tell you exactly  
15 what the design is.

16 The last thing is that there is one sequencer for  
17 each train. It sequences the loads to both on and offsite  
18 power for its associated train. And no single failure in these  
19 items are going to prevent safe shutdowns since all the safety  
20 trains are, you know, redundant.

21 So we do have a single sequencer per train. It  
22 sequences for both the onsite and offsite power.

23 MR. HANAUER: Tested at what frequency?

24 MR. WHITE: You mean like automatic check? Is that  
25 what you are talking about?

mm 1 MR. HANAUER: Well, the monthly test usually doesn't  
2 test the sequencer in most plants.

3 MR. WHITE: Right.

4 MR. HANAUER: At what frequency are you proposing to  
5 test the sequencers, since they are now essentially a vital  
6 part of your single failure power source?

7 MR. WHITE: Okay.

8 As you are probably aware, we haven't written the  
9 tech specs for the plant yet, so I'm not aware of what the --

10 MR. HANAUER: You are backing yourself into a  
11 corner, where you do a lot of load sequencing testing. That's  
12 what I'm worried about.

13 I don't want to fight with you about load sequencing  
14 testing.

15 DR. MATTSON: The one for Palo Verde was sort of a  
16 continuous test. Every three minutes sort of thing.

17 MR. WHITE: Well, that is the sort of thing that  
18 we would like to be able to be in Palo Verde's position to  
19 say yes, this sort of thing is going to do this automatic  
20 check every three minutes or twenty seconds or whatever number  
21 it is going to be.

22 We haven't got a vendor yet, but it is our feeling --

23 DR. MATTSON: Let me summarize our difficulty as  
24 I understand it.

25 We don't have generic criteria for load sequencers

1 for application at the CP stage.

2 We understand that it is not fair game for us to  
3 require you to present design details for our review at the  
4 CP stage in this area as well as other areas.

5 But we do need to get some kind of a warm feeling  
6 that you understand what we expect by way of quality and  
7 safety grade character of a load sequencer. And, you need to  
8 have an opportunity to understand those requirements.

9 I wonder if we ought not to set up a meeting to  
10 specifically deal with this sometime between now and early  
11 January.

12 MR. HANAUER: They don't have the information.

13 DR. MATTSON: No, but I think we need to sit down  
14 and reason together on the design criteria that they could  
15 state and that we could accept. I think it is possible to  
16 state design criteria in fairly short order, that we could come  
17 to an agreement on.

18 Steve, do you agree with that?

19 MR. HANAUER: No. You worry me.

20 It is December 20th, and as you point out, we have  
21 not gotten the design criteria of this kind.

22 DR. MATTSON: No, but we have accepted these devices  
23 on other machines.

24 MR. HANAUER: We have accepted this, this and this.

25 That's right. I wouldn't want to be in a position of requiring

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1 an electronic device with self-testing every three seconds.

2 We could try, of course. But, you worry me.

3 MR. WHITE: Well, our best position is that appears  
4 to be the direction that the vendors are going, and that would  
5 likely be available to us in the timeframe that we are going  
6 to purchase them, '81, '82, '83. And we would not have a  
7 problem of committing to sign that we would have--you know,  
8 that we would be testing these things at a very rapid pace,  
9 our automatic check, whatever you want to call it.

10 And we do have the criteria such as the 323 and the  
11 344 and the 279, those are criteria that if we can make those  
12 commitments at this stage today, the Staff, we feel, should be  
13 able to get the warm feeling and resolve the issue.

14 We realize that the sequencing description has got  
15 to be fairly short, just because a lot of the design details  
16 aren't available.

17 On the other hand, we don't realize --

18 MR. HANAUER: As I understand, the docket at this  
19 moment doesn't even say that you are using the same sequencer  
20 for offsite and onsite.

21 MR. WHITE: I can't address that.

22 I think there is a page that discusses --

23 MR. HANAUER: I don't think so.

24 You know there is nothing wrong with it, but the  
25 docket is uninformative. I am really worried about general

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1 criteria, I am worried about resources.

2 DR. MATTSON: No, no. I mean general criteria for  
3 this plant. I don't mean general criteria for every plant.

4 But could we come to an agreement, Om, in short  
5 time on the general character of the load shedding equipment?

6 MR. WHITE: We are proposing to change the next amend-  
7 ment, to put on the docket what --

8 MR. HANAUER: The right stuff, whatever that is.

9 MR. SUMPTER: Just what we read to you. That is  
10 all we have got, and that is all we are going to have for a  
11 couple of years.

12 MR. WHITE: We can change the words to say we don't  
13 know whether it is going to be electronics or not.

14 DR. MATTSON: But I think it would be worthwhile for  
15 you to sit with Mr. Chopra and figure out what his additional  
16 interests might be, because I think his additional interests  
17 are of a character that they could be readily added to this  
18 list if there are any.

19 He hasn't had a chance to react to this set of  
20 three IEEE standards, plus the commitment to put one on each  
21 redundant chain, plus the commitment to provide for high-  
22 frequency testing, those kinds of things.

23 Given that opportunity to react, and an opportunity  
24 to sit down with you, he might say yes if you put in blank,  
25 blank and blank, we could accept that at this stage.

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1 MR. WHITE: Is it possible to review our words  
2 and get back with this later?

3 MR. VASSALLO: Can I offer a suggestion, Roger?

4 Suppose they come up with some acceptable commitment  
5 at this stage, and also add in our SER a sort of a condition, a  
6 requirement that we would want to see this prior to finalizing,  
7 or prior to procurement, prior to purchase.

8 MR. HANAUER: I like that better.

9 MR. VASSALLO: We have done this on occasion. We  
10 don't like to have a lot of post-CP items, but I think this  
11 might be a way of resolving this so that you can get some sort  
12 of commitment now, and then before going into, you know, that  
13 procurement, we would have an opportunity to be further ahead  
14 on it on our side and look at it.

15 DR. MATTSON: Let me ask Om:

16 Don't you think it is possible to sit down with them,  
17 even today, and talk through this subject, and draft a commit-  
18 ment that would be acceptable to us?

19 I would like not to have a post-CP item if I can  
20 avoid it. Fitting in post-CP review matters in this data are  
21 even more difficult, than fitting in construction permit  
22 reviews at this stage.

23 MR. VASSALLO: I realize that. But I offered it  
24 as --

25 MR. HANAUER: Om is the reviewer on Palo Verde.

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1 The schedules are the same.

2 For him to take a day to do this is feasible. If  
3 it turns into a week's work, it is not feasible. One or the  
4 other schedule is --

5 DR. MATTSON: I was proposing to try to wrap it up  
6 today.

7 If you have got technical people that he can get on  
8 the phone later this morning, with you and he on the phone at  
9 this end, and try to work your way through a commitment of  
10 that sort, that you can file an amendment that he can find  
11 acceptable. I will give you the backup if you want, and if you  
12 require it, it is really necessary to write a post-CP item,  
13 to go ahead and do it. But I would prefer that you --

14 MR. HANAUER: It would depend on the outcome of  
15 today's discussion.

16 DR. MATTSON: I would prefer you not do that.

17 MR. CHOPRA: How about if they just commit to the  
18 same sequencer that Palo Verde is using?

19 DR. MATTSON: I think that probably smacks of  
20 restraint of trade. I don't think I can do that.

21 MR. SUMPTER: Oh, yes. It depends on what manufacturer  
22 you buy it from.

23 MR. HANAUER: What we have to do is to distill the  
24 criteria behind that kind of choice, and that is harder.

25 We will work on it today. If we don't succeed today

1 we will have to use your safety valve.

2 DR. MATTSON: The safety valve being a post-CP item.

3 MR. HANAUER: Yes.

4 DR. MATTSON: With the sort of general criteria  
5 being acceptable now, but we want to see it before it is  
6 purchased.

7 MR. SUMPTER: What is the official Staff position  
8 on that? I know of no change in any criteria relative to  
9 the sequencers. This is a new question.

10 DR. MATTSON: The Staff position is that you have to  
11 have a design which can assure that safety grade equipment  
12 gets the power it needs from offsite even when there is a low  
13 voltage or instability condition offsite.

14 MR. HANAUER: You are on the wrong subject.

15 DR. MATTSON: And the Palo Verde docket agreed that  
16 shedding equipment is the way to do that rather than having  
17 transformers that guarantee you can do it, and said shedding  
18 equipment should be of high reliability.

19 We don't have specific criteria for what generic --  
20 generic criteria for what constitutes an acceptable piece of  
21 shedding equipment.

22 You have come in rather late with the proposal  
23 to shed with some general statements as to what the shedding  
24 equipment will look like. There may or may not be acceptable  
25 general statements. We need to review them, tell you what else

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1 we need to see.

2 If you are unable to provide that because of the  
3 late stage of this plant, write it out as a post-CP item.

4 I am reluctant to do that, but it is certainly  
5 within the law and we can do it.

6 That is the Staff position I paraphrased there?

7 MR. HANAUER: Yes.

8 MR. WHITE: I think we are moving along good enough  
9 now.

10 MR. CHOPRA: See, there was nothing in the PSAR  
11 about sequencing of loads on offsite power, really.

12 MR. RICHARDS: In Amendment 48, I might mention  
13 that that is --

14 MR. CHOPRA: I think two lines in Amendment 48.  
15 You did put in two lines that you are going to sequence loads.  
16 But that wasn't really enough.

17 MR. SUMPSTER: When have you identified that load  
18 sequencing was a problem, to start with?

19 DR. MATTSON: We didn't know you were going to have  
20 to shed loads until Amendment 48.

21 MR. WHITE: We became aware of it in some telephone  
22 call several months ago.

23 DR. MATTSON: There is a way to not shed loads. Do  
24 you understand that?

25 There is a way to not have to shed loads.

mmn 1           That is, to buy transformers with sufficient  
2 margin to handle these loads. That is certainly acceptable  
3 to us.

4           We presumed that that was the way you were going.  
5 It was not until late in the review that Mr. Chopra realized  
6 that you were not proposing to do that, that you were proposing  
7 to buy load shedders.

8           MR. ROSS: Is there any question but what sequencers  
9 can be designed, they are feasible, and the Staff will  
10 accept --

11           DR. MATTSON: Yes.

12           MR. HANAUER: Yes, there are feasible sequencers.

13           MR. WHITE: I think the progress of the meeting is  
14 going real good, and I think we can get a phonecall back to  
15 Houston or to EBASCO and we can work it out.

16           I guess for now, why don't we go ahead and give  
17 you the writeup that we have saving that we will be looking  
18 at it, while we are finishing up the meeting, okay? And then  
19 we will make a phonecall and give it to Om after we have  
20 finished up the rest of these items.

21           MR. BOYD: Let me make a point in this regard,  
22 and I guess it applies to the ATWS stuff as well as that  
23 thing.

24           Even though we are sometimes only passing around one  
25 copy, we want to make sure that we get all of these things

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1 passing back and forth bound up into this so that we will all  
2 have it and know exactly what it was. You will know what we  
3 have, and we will know what you have. And the rest of the  
4 world will know what both of us have.

5 MR. WHITE: We have another copy of that.

6 MR. BOYD: Unfortunately, we only gave you one  
7 copy of that ATWS material. If you would undertake to make  
8 sure that you get a copy made and it gets bound up into the  
9 record in the appropriate place, we would appreciate it.

10 (Sequencer document supplied by Mr. White follows:)

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Encl. 3

We have not yet specified a type of sequencer for automatic loading of the safety busses. It will meet the following criteria:

1. Designed to meet applicable NRC requirements including IEEE 323-1974, IEEE 279-1971 and others.
2. Will incorporate most feasible technology available at time of procurement and highly probable that electronics will be used (as opposed to electromechanical). It is not possible to be specific until vendors identify cost and qualification parameters of different technologies.
3. There will be only one sequencer provided for each train. It will sequence the loads to both on and off site power for it's associated train. No single failure will prevent safe shut down since the safety trains are redundant.

1 MR. MOON: Okay. Let us go to the engineering  
2 questions. Oh, just a moment.

3 MR. CHOPRA: Okay.

4 I don't think this is sufficient, really.

5 What I am going to do is, I will go upstairs and  
6 show you what I have from Palo Verde. They did not give me  
7 the manufacturer's name or anything, either. But, they gave me  
8 something we accepted.

9 MR. WHITE: Okay.

10 MR. CHOPRA: And if you can come up with the same --  
11 whatever they provided.

12 MR. WHITE: Okay.

13 DR. MATTSON: Except for the word "exact," if they  
14 can characterize a piece of equipment that is similar in our  
15 view, then we will accept that. And you can go off and do that  
16 now, meet with them later today and give them a description  
17 which, if they come back with an amendment, there is a high  
18 likelihood we will accept it.

19 MR. CHOPRA: Okay.

20 DR. MATTSON: Okay.

21 MR. MOON: Okay, engineering.

22 MR. BOYD: That is all three of these?

23 MR. MOON: Yes.

24 DR. MATTSON: Thank you, Om.

25 MR. MOON: Okay, we will go to the engineering issues.

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1 Steve Pawlicki has joined us. Steve is the Acting  
2 Assistant Director for engineering.

3 With him is Bob Busnak, Branch Chief, Mechanical  
4 Engineering Branch.

5 And, Franz Schauer, Branch Chief for Structural  
6 Engineering Branch.

7 Steve is also the Branch Chief for the Materials  
8 Engineering Branch.

9 The first issue -- we had some earlier questions  
10 about compliance with Appendix G and H, 10 CFR Part 50.

11 At this time it is my understanding that our  
12 review is now complete subject only to some clarifications to  
13 be provided by the Applicant. But no basic new technical  
14 information?

15 MR. PAWLICKI: All issues have been resolved.

16 MR. WHITE: I think this will be resolved pending  
17 documentation of commitments we have made in phone conversation  
18 with the Staff.

19 We have got the pages here today. We can show you  
20 that we have made some changes. We say that on page 5.2-20,  
21 that Allens Creek uses both transverse and longitudinal  
22 specimens for qualification testing. And, allens Creek uses  
23 transverse specimens to meet 10 CFR 50, Appendix H, surveillance  
24 requirements.

25 So we specifically state that type of compliance.

1 MR. PAWLICKI: You are going to meet the Appendix G  
2 requirements?

3 MR. WHITE: Right.

4 And the other places that we had some words that  
5 were rather confusing with regard to interpretations of the  
6 Guide, we have deleted those and just say that, you know,  
7 bolting will meet this added requirement:

8 For example, in 5.2-20(c), rather than any other  
9 discussions.

10 And, on the section on 5.2-20(d) we deleted words  
11 at the beginning of 52469 that were rather confusing before.

12 And the last major change, I guess, was on the  
13 first page, I forgot to look at, 5.2-19, where we say "the  
14 initial upper shelf fracture energy levels with the core  
15 beltline material is required to be 75."

16 I believe before it was 70.

17 MR. PAWLICKI: Which page is that?

18 MR. WHITE: It is on page 5.2-19 at the very bottom.

19 It is our understanding, pending this documentation,  
20 the issue will be resolved.

21 DR. MATTSON: Do you agree with that, pending this  
22 documentation that this issue is closed?

23 MR. PAWLICKI: Well, we will first review it again:  
24 I mean what you have in here.

25 But based on my conversation with Mr. Litton, who

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1 discussed the subject with you, I am certain it is resolved.

2 DR. MATTSON: Are you going to put a copy of this  
3 draft information in the transcript of today's minutes?

4 MR. SUMPTER: If he could get back to us today,  
5 since he has got those copies, if it is possible.

6 MR. BOYD: That would be useful.

7 DR. MATTSON: Do you think you could take a quick  
8 look at that today and tell them if this information appears  
9 satisfactory?

10 MR. PAWLICKI: In an hour or so.

11 MR. RICHARDS: This material is part of the  
12 draft amendment that we gave the reporter earlier.

13 DR. MATTSON: Okay. So that is the first one that  
14 is bound into the record already.

15 MR. RICHARDS: Right.

16 MR. MOON: Steve, on this list I did not include  
17 Regulatory Guide 1.99.

18 That issue has also been taken care of?

19 MR. PAWLICKI: I understand this has also been  
20 decided, that if Houston Lighting & Power Company has agreed  
21 to comply with the 1.99 estimate that the transition  
22 temperature is a function of neutron fluence?

23 MR. WHITE: I believe that is documented on page  
24 C-1.99-4.

25 MR. BOYD: Again in that memo?

1 MR. WHITE: No. That is already in the PSAR.

2 MR. MOON: Okay.

3 The next issue is annulus pressurization loads.  
4 I believe Steve or Bob has a Staff position to discuss.

5 MR. BOSNAK: Yes.

6 The annulus pressurization is part of LOCA and  
7 Staff position is such that that is one of the effects that  
8 you have to consider when you are considering a LOCA load.

9 And if it is LOCA and SSE, those may be combined  
10 by the SRSS method per the Staff NUREG document.

11 MR. WHITE: Okay.

12 I guess we propose to change the PSAR page 3.96(b)  
13 to reference a table that was already in the PSAR for the  
14 General Electric supplied Class I supports which you mentioned  
15 was the concern. The Class I supports supplied by General  
16 Electric.

17 And that table that we are referencing is 5.2-2(a).  
18 There has been no change to the table. It was just the component  
19 support section did not reference that Chapter 5 table before.

20 So I guess what we are saving is the commitment, in  
21 essence, was already in the PSAR. It was just in a different  
22 chapter than Section 3.9, which is where the question came  
23 from.

24 MR. BOSNAK: Yes. It was Class I supports, the  
25 vessel supports that we wanted to be sure were designed for that

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1 load. It wasn't clear.

2 If you cleared it up, and that is your intent, that  
3 will close the issue.

4 MR. WHITE: It is our understanding that Table  
5 5 2-2(a), specifies that LOCA and safe shutdown earthquake  
6 will be combined.

7 MR. BOSNAK: We needed the clarification that LOCA  
8 does include annulus pressurization.

9 MR. RICHARDS: That is a copy of that table.

10 (Handing document to Mr. Bosnak).

11 MR. BOSNAK: Fine.

12 MR. VASSALLO: And that is part of the submittal?

13 MR. RICHARDS: No, it is already in the PSAR.

14 MR. WHITE: The change in the reference will be in  
15 the draft amendment. The table was not being changed. We felt  
16 the table was already adequate.

17 We would request, if you can take a look at it and  
18 see if that resolves the problem and get back with us today if  
19 you can.

20 MR. BOSNAK: Right.

21 MR. MOON: I thought there was some problem that the  
22 reviewer felt the annulus pressurization was excluded though,  
23 somehow or another, even with this change.

24 MR. BOSNAK: That is why we want to be sure that that  
25 is included.

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1 You say you feel it is already there?

2 MR. RICHARDS: You will notice it refers to  
3 Event 16. That is explained on other pages in the PSAR.  
4 That is the pipe break and related effects and the annulus  
5 pressurization comes under that heading.

6 Now it is not called out specifically, but that is  
7 part of the pipe break.

8 MR. SUMPTER: Do you have the reference for Event 16?

9 MR. RICHARDS: It is on the next page after that one.

10 DR. MATTSON: But it is clear that you are committed  
11 to design the reactor supports taking into account the combina-  
12 tion of annulus pressurization loads which occur as a result  
13 of a pipe break in the annulus, said combination with the  
14 safe shutdown earthquake and the responses combined by the  
15 SRSS methodology?

16 And that these changes to the PSAR incorporating  
17 by reference material elsewhere in the PSAR, are sufficient in  
18 your judgment to state that commitment?

19 MR. WHITE: That's correct.

20 DR. MATTSON: And if it is not, then we will tell you  
21 what other conforming language later today you need to make in  
22 the PSAR to make that crystal clear.

23 MR. WHITE: Exactly.

24 DR. MATTSON: Good.

25 MR. MOON: Okay.

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1 The next item is soil structure interaction.

2 The Applicant submitted additional information on  
3 Amendment 48 in December.

4 The Staff is now reviewing that information, but  
5 the review is not yet complete.

6 MR. SCHAUER: That's correct.

7 DR. MATTSON: However, the reviewer is not here  
8 today because he is ill.

9 MR. SCHAUER: The reviewer is here. I can bring  
10 him in.

11 DR. MATTSON: Okay, he is back today.

12 It is my understanding that he is working on  
13 this item full time at the moment?

14 MR. SCHAUER: That's correct.

15 DR. MATTSON: And that the prognosis is that the  
16 information supplied is satisfactory, but that review takes  
17 some days to complete and won't be complete until next week?

18 MR. SCHAUER: We estimate the 5th of January.

19 DR. MATTSON: And we expect that we will be able to  
20 meet the January 8th SER input date on the project as set up?

21 MR. SCHAUER: I think we could, yes.

22 MR. SUMPTER: Would it assist or help speed his  
23 review up if we talked to him over the phone, at all?

24 MR. SCHAUER: Well, I can tell you what we are looking  
25 at right now.

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1 We had a meeting, I understand -- I was not in  
2 attendance, of course -- in which the Applicant agreed to the  
3 insertion of a 160 response spectra input at the base of the  
4 foundation area.

5 The results of this particular input, according to our  
6 informal meeting, were at the high frequency end of the response  
7 spectrum, that the response spectrum was 10 to 25 percent high.  
8 Also -- and that this particular increase in the response  
9 spectrum for elevated levels in the structure could be accommo-  
10 dated.

11 In addition, there were some higher peaks in the  
12 range of 3 to 7 cps, and that it was going to be agreed by the  
13 Applicant that he would insure that his equipment would not  
14 be within this range.

15 Thirdly, it was our understanding from this meeting,  
16 that the new 160 response spectra which was being applied at  
17 the base of the model, base of the foundation would be such  
18 that the structures could accommodate the new member forces  
19 involved.

20 Now, my staff reviewer is going to be specifically  
21 looking in Amendment No. 48 for documentation of these three  
22 points. And, assuming that these points are indicated in  
23 Amendment No. 48 in the manner that I have described, this will  
24 be acceptable.

25 MR. WHITE: I think there might be a point of

1 clarification: That at the meeting we stated that we knew  
2 of no equipment that was in that range of 3 to 7, and that  
3 if anything did fall in that range then we would assure our-  
4 selves that we met the maximum peaks for the two different  
5 analyses that we submitted.

6 DR. MATTSON: Now, is that language in Amendment 48?

7 MR. WHITE: That was in 48.

8 So what we said was not that no equipment would  
9 be in that range, but we said we knew of none that was.

10 However, if they did fall in there we would  
11 utilize the technique that would give us the highest values  
12 in that range for the responses.

13 MR. SCHAUER: In other words you would design the  
14 equipment for those peaks if they were in that range?

15 MR. WHITE: Yes.

16 MR. SCHAUER: That's acceptable to us, if it is in  
17 the amendment.

18 MR. SUMPTER: We stated to Mr. Chan, this is what we  
19 expect the results to be of all of these various analyses  
20 which you were going to submit. Would you be satisfied if  
21 we said this is what we expect the results to be?

22 And he said, if those were the results, he would  
23 be satisfied.

24 And those are the results per the curves that we  
25 submitted.

mm 1 DR. MATTSON: Just for the record, the meeting  
2 that Dr. Schauer referred to is the Appeals Meeting Mr. Boyd  
3 and I heard on the subject several months ago, which has been  
4 documented?

5 MR. SUMPTER: No, a subsequent meeting to that.

6 DR. MATTSON: A subsequent meeting to that between  
7 the reviewer and your Staff where the technical details were  
8 referred to in that Appeals Meeting were understood between  
9 the parties?

10 MR. SUMPTER: That's correct.

11 MR. MOON: Anything else, Franz?

12 MR. WHITE: You require no further information that  
13 you are aware of at this time?

14 MR. SCHAUER: No.

15 I want to go on record that those three items are  
16 the key review items, though. And if they aren't in the document  
17 in the manner in which I stated, it would still be an open  
18 item.

19 DR. MATTSON: Yes. And I guess we would be in a  
20 position of knowing that rather soon if he is focusing his  
21 review in those areas. And we would expect, Franz, if we get  
22 into difficulty in these areas, we ring these folks up right  
23 away, try to get it worked out over the telephone, tell them  
24 what more is necessary.

25 If it can't be resolved over the telephone, we get

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1 it up our management chain, up to their management; get it  
2 back here in Washington, and let's work it out.

3 MR. MOON: Okay.

4 The last item is load combination methodology.

5 This is the SRSS versus absolute sums.

6 The Applicant has committed to the Staff's position,  
7 but as I understand, has suggested that there may be systems,  
8 components and structures for which he will need to get an  
9 exception from the Staff's position.

10 There are words in the PSAR currently about  
11 later review of such proposed exceptions.

12 I believe the position we are in right now is  
13 that we need some clarification so we have a clearer mutual  
14 understanding.

15 MR. WHITE: As we understand the concern here, our  
16 commitment presently says that we will inform the NRC or  
17 justify to the NRC, the use of SRSS prior to the completion  
18 or installation of equipment, and what we need to commit to,  
19 or what we propose to commit to.

20 And this proposed amendment has been provided to  
21 the court reporter, to say that in each such case construction  
22 or installation will not be initiated until NRC approval of  
23 the justification has been requested.

24 DR. MATTSON: Wait a minute.

25 We have a fairly clear understanding of where we

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1 are headed with SRSS and where we are not headed with SRSS.

2 MR. WHITE: Okay.

3 DR. MATTSON: And I think we need to ventilate that  
4 a little bit.

5 We have already taken a position fairly widely  
6 disseminated for BWR owners and operators and applicants, that  
7 SRSS is acceptable for design of equipment for LOCA plus SSE  
8 loads.

9 And we have also generally acknowledged that it is  
10 possible that SRSS may be acceptable for equipment for  
11 safety relief valve loads in combination with the operating  
12 basis earthquake loads.

13 That review is still ongoing and is scheduled for  
14 completion in early January for generic applicability to all  
15 BWRs.

16 MR. WHITE: We were talking about fault conditions,  
17 what was a Staff request. This is an additional --

18 DR. MATTSON: Wait a minute. By equipment I meant  
19 the primary system, the piping, the valves, the pumps. And I  
20 did not mean the structures.

21 In the case of structures, it has been our position  
22 and continues to be our position that absolute sums of  
23 responses for the LOCA and SSE are required.

24 Now which of these do you still want to hold  
25 in abeyance?

1 MR. WHITE: Okay.

2 We are talking that ASME Class II, II and III  
3 components and supports.

4 MR. BOSNAK: How about the electrical equipment?

5 In other words, where there is a response spectra  
6 that has to be combined for whatever the loads happen to be,  
7 what procedure are you intending to use or are you using now?

8 MR. WHITE: Well, the question doesn't address  
9 electrical equipment, but it is my understanding that we are  
10 using absolute sum.

11 MR. BOSNAK: Okay. That is what I wanted to find out.

12 MR. WHITE: And what we are talking about, we are  
13 using absolute sum unless we think we can justify otherwise.  
14 We will request NRC to review the justification prior to  
15 initiating any installation or construction.

16 DR. MATTSON: That is too confused for me.

17 I am not willing to leave at this point, that kind  
18 of uncertainty on something like the containment, for example.

19 MR. ROSS: Roger, also on the procedural aspect,  
20 we had been running into difficulties of what amounts to  
21 post-CP work. I think Mr. Newman was in another case. He  
22 probably can tell you --

23 DR. MATTSON: I have the same problem you do.

24 MR. ROSS: By amending the CP in the hearing state  
25 that you are in, might cause more problems than it cures.

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1 DR. MATTSON: You are committing to use absolute  
2 sum everywhere except some areas.

3 MR. SUMPTER: We have already purchased some  
4 equipment and it may be physically practically impossible to  
5 do otherwise than square root sum of the squares. Because  
6 the equipment has already been purchased.

7 DR. MATTSON: But if you mean by equipment the same  
8 thing we mean by equipment, then SRSS is probably okay.

9 What we need to understand is precisely where you  
10 want to apply SRSS.

11 MR. WHITE: Okay.

12 We say that Applicant commits to apply the  
13 generic resolution of the issue to design of Allens Creek.

14 DR. MATTSON: The generic resolution of what issue?

15 MR. WHITE: Question 110.6(3).

16 We go on to say in our response: However, for  
17 cases --

18 MR. SUMPTER: You give us the question. Do you  
19 have the question there?

20 DR. MATTSON: Yes.

21 MR. WHITE: Those are our answers that have been  
22 proposed.

23 (Handing document to Dr. Mattson)

24 DR. MATTSON: Okay. So this is a rather narrow  
25 issue.

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1 Is this your question, Bob?

2 MR. BOSNAK: That's our question.

3 DR. MATTSON: What do you mean by ASME Class I, II,  
4 and III components and supports?

5 MR. BOSNAK: That is all of the safety-related  
6 systems. The primary system, of course, is the last one. And  
7 the others, safety systems that are used, are either Class II  
8 or III.

9 So we are talking about all of the safety systems.

10 DR. MATTSON: But have we not taken a generic position  
11 on BWRs for LOCA and SSE combination of loads of said  
12 equipment SRSS is acceptable?

13 MR. BOSNAK: That's correct. That question was  
14 written prior to our position on SSE plus LOCA.

15 DR. MATTSON: Okay.

16 So you have committed to apply the generic  
17 resolution of this issue to the design of Allens Creek; said  
18 generic resolution being partially in hand today, i.e. SRSS  
19 is acceptable for Class I, II and III components and supports  
20 for LOCA plus SSE?

21 MR. BOSNAK: Well it is really for Class I if the  
22 NUREG document speaks to the primary loop. So you are talking  
23 to Class I.

24 That is currently out on the street today. Not the  
25 other systems.

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1 MR. WHITE: We prefer to leave the words: "just  
2 the generic resolution of this issue," even though part of  
3 the generic resolution is out, rather than split the words.  
4 We would rather just leave it as this, if that is acceptable.

5 MR. ROSS: What if they committed to your NUREG  
6 guide. Would that even be more clear?

7 MR. BOSNAK: The commitment can be very narrow. It  
8 can be the LOCA and SSE loads on the primary loop will be  
9 combined by SRSS.

10 And if that is as far as you wish to go, that is  
11 what we have today on the street.

12 If you are going to do all the rest by absolute sum --  
13 is that what you are intending to do?

14 MR. WHITE: Our feeling is that if the Staff has  
15 found SRSS acceptable in certain areas, that is likely the way  
16 that we will head.

17 But what we are saying is that we commit to generic  
18 resolution, the best part of the generic resolution for  
19 certain components, primarily loop then we will go that way.

20 DR. MATTSON: The generic resolution of what?

21 I don't think I have the generic program in this  
22 area, is what I am having difficulty understanding. I have  
23 some lead MARK 2 plants at which I have taken some positions  
24 for licensing of those plants.

25 I have got some intermediate MARK 2 plants that I am

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1 like to take somewhat different positions because there is more  
2 data to come in.

3 Eventually I am going to have to devise a Staff  
4 position for the MARK 3 facilities; one of which is Allens  
5 Creek. There are others in the pipeline before Allens Creek  
6 comes in the pipeline.

7 MR. RICHARDS: Don't you have under review right now  
8 the Interim Containment Structures Design Report from General  
9 Electric?

10 DR. MATTSON: I have never heard that report before.  
11 Have you ever heard of that report before?

12 MR. SCHAUER: No, I haven't. Not with that title.

13 MR. RICHARDS: They have just submitted Revision 2  
14 of that report which addresses these items as it relates to  
15 Class I equipment.

16 DR. MATTSON: Maybe the problem here is simply that  
17 the reference is too vague and it needs to be more specific.

18 You are saying you are committing to a generic  
19 resolution of something, and my difficulty is, I know of a  
20 lot of generic work going on in this area, but I can't see  
21 what you are referencing to.

22 Are you committing to what the lead MARK 2 plants  
23 commit to? I don't think so because there is a lot of test  
24 information and analysis going to go on for subsequent plants  
25 that will likely be less stringent than the requirements for

1 those lead MARK 2s.

2 MR. SUMPTER: Maybe it is the timing of this question,  
3 when you gave us this question you hadn't resolved it. And I  
4 think the day we came in to discuss it you just got a paper  
5 out on the street.

6 DR. MATTSON: Yes. This is a rapidly changing area.

7 MR. BOSNAK: Which equipment is it that you have in  
8 house now that you have some uncertainty whether you can meet  
9 absolute sum on?

10 MR. WHITE: I guess what we are saying is that  
11 being a reactivated project, there may be.

12 We are not aware of anything right now, but we are  
13 saying there may be something that could give us difficulty.

14 If it does give us difficulty, what we are proposing  
15 to do is come back with detailed justification for NRC  
16 approval that would allow us to go SRSS for that particular  
17 equipment, possibly.

18 If not, then we would have to do something to fix  
19 the equipment to go with the absolute sum.

20 And all we are trying to do at that stage is say  
21 that we weren't certain that it was decided yet on how you  
22 can apply these combination loads, how to do it.

23 So we were leaving the commitment open to allow us  
24 to come back and do something different than absolute sum.

25 But we were proceeding along the track of using absolute sum

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1 wherever possible.

2 And I guess what you are saying is, you have already  
3 allowed certain areas to use SRSS.

4 And we say, great, we will probably pick up on that  
5 and come back in and say we wish to use SRSS in these areas  
6 based on Staff concurrence in NUREG -- whatever the number is --  
7 is the way we would like the pathway to go in this issue.

8 And then, if we have a particular problem, or the  
9 Staff comes up with another broad class of equipment that you  
10 can use SRSS on, we would come back to NRC again prior to,  
11 you know, installation or construction, and request again to  
12 use SRSS.

13 DR. MATTSON: Let me see if I see a way to state  
14 this.

15 Can we put in the SER on the basis of this discussion,  
16 the information that we have on the docket, a simple statement  
17 that we require the Applicant use absolute sum for ASME Class I,  
18 II and III components and supports, except where the NRR  
19 Category 4 matter, which we can provide a reference to;  
20 the NUREG document and Mr. Denton's approval of the SRSS for  
21 LOCA plus SSE is acceptable for this plant. And if the  
22 Applicant proposes to use SRSS in other areas, he must justify  
23 it. And that makes it a post-CP item doesn't it?

24 MR. BOSNAK: It is a post-CP item. In other words, he  
25 has to do it before he gets to a position where he just --

mm 1 DR. MATTSON: Bob, what position did we take on the  
2 Black Fox docket?

3 We have got the same situation at Black Fox.

4 MR. VARGA: We made them do it. We make them  
5 commit to the SRSS for the reactor coolant pressure boundary  
6 only, which is what the NUREG document states. And then  
7 absolute sum for everything else.

8 MR. WHITE: I want to point out, this isn't a typical  
9 post-CP because we know exactly what we are going to do.

10 We will take exceptions only back to the NRC. It  
11 is not that we have to get back together and decide whether to  
12 go forward. We are going to go forward with absolute sum right  
13 now, and we would only be coming back to take exceptions  
14 to absolute sum.

15 MR. SUMPTER: I think in any regulation we come in  
16 to a meeting and then we find out it is impossible to do so,  
17 we are going to have to come back.

18 MR. BOYD: It is not a post-CP item in the general  
19 sense of the word. But, you are entitled, assuming you get  
20 a favorable construction permit some day, to amend your  
21 application from time to time, and people do find in that  
22 phase that for whatever reasons they wish to make changes,  
23 then we have to focus on them.

24 It is overstating it, as I think some of us have,  
25 by anticipating that this is going to be the case. We would

mm 1 like to anticipate that it is not going to be the case.

2 And if it turns out it is, it is. We have to face it.

3 DR.MATTSON: But the fact that this is in the advanced  
4 stage of procurement and construction is not my problem.

5 MR. WHITE: Right.

6 DR. MATTSON: This is CP reactivated late at your  
7 request. And that CP we require a commitment to design to  
8 absolute sum with the exception of this SRSS approval, limited  
9 SRSS approval, which I have referred to earlier.

10 And we require that commitment with the expectation  
11 that it will be carried out.

12 You have already said that there may be areas where  
13 you have already procured equipment that you know today can't  
14 meet that requirement. So that tells me it is an empty  
15 commitment in at least some other areas.

16 I think we need to explore those other areas.  
17 Because we may not accept them.

18 MR. WHITE: Okay.

19 Are you saying that on this page, instead of  
20 saying "applicant commits to apply generic resolution," we  
21 need to say "applicant commits to use the absolute sum method  
22 for this issue in design of Allens Creek. However in those  
23 cases where generic resolution has been determined by the  
24 Staff to allow the use of SRSS. . ." --

25 DR. MATTSON: Reference the NUREG number which we

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1 can give to you. And I assume you have a copy of it already.

2 MR. WHITE: Okay.

3 DR. MATTSON: It is NUREG 0484.

4 MR. WHITE: You are talking about, let's revise the  
5 words to say that you want us not to commit to generic resolu-  
6 tion, you want us to commit to absolute sum except where NRC  
7 has allowed SRSS. And then you would also allow us to add the  
8 caveat that if we have any exceptions we want to try to  
9 justify them to NRC on a technical basis, that we will get back  
10 to NRC prior to the installation.

11 MR. ROSS: Isn't that implicit on almost everything  
12 you do?

13 DR. MATTSON: Yes, but it clears up this point that  
14 they know there are exceptions they have to take because they  
15 have already procured equipment. That is not a basis for  
16 exception.

17 A basis for exception is the technical basis that  
18 he just described. That is it is safe, and it meets the  
19 Commission's regulations.

20 MR. WHITE: Exactly.

21 DR. MATTSON: And that is the basis for getting an  
22 exception. Not that the equipment has already been procured.

23 MR. WHITE: Exactly.

24 DR. MATTSON: That commitment we would except.

25 MR. ROSS: Is that a principal design criteria

1 within the meaning?

2 DR. MATTSON: They have agreed to a principal  
3 design criterion of absolute sum, except where it can be  
4 technically justified the absolute sum is not necessary to meet  
5 the Commission's regulations. We already know that it is  
6 possible to technically justify some exceptions to absolute sum.  
7 One such justification is in NUREG 0484, the Staff's Report on  
8 Methodology for Combining Dynamic Responses.

9 That report, describing the use of SRSS for LOCA  
10 plus SSE for Class I components.

11 There may be others. We acknowledge there is one  
12 one already under review for the MARK 2 containments. That  
13 being the use of SRSS for safety release valves and OBE loads.

14 There may be others. One which we have heard people  
15 refer to has to do with structures. We don't think that that  
16 is one where SRSS will likely be approved. We think absolute  
17 sum will likely continue to be the requirement for some time  
18 in that area.

19 Now does that give you enough information to write a  
20 response along the lines you just described, because I think  
21 that response is acceptable and I believe it is consistent with  
22 what we required on Black Fox.

23 MR. ROSS: Could you make it a little bit harder,  
24 Roger, saying that they have to use this until and unless  
25 justified?

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1 DR. MATTSON: Yes.

2 That is what I understood him to say.

3 MR. NEWMAN: I think your phraseology, though, was  
4 clearer, Roger. What you said was except to the extent that  
5 it may not be necessary to use that method or methodology  
6 to comply with Commission regulations.

7 DR. MATTSON: And you justify it and we agree with  
8 it.

9 MR. NEWMAN: Right.

10 MR. ROSS: But absent that it defaults to the  
11 original?

12 DR. MATTSON: It defaults to the original, absolute  
13 sum.

14 MR. WHITE: Can we have a caucus and write down  
15 the words?

16 DR. MATTSON: Yes. I think it is the last item on  
17 the agenda.

18 MR. VARGA: I would like to see the words. We have  
19 gone through this about four times.

20 MR. BOYD: Before we do that, let me test what you  
21 are saying.

22 Are you saying that you are worried that there may  
23 be some things, because of procurement, that may not fall into  
24 this?

25 Or, you know that there are things?

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1 Or, that you are merely conjecturing as a possibility  
2 that there are some, in which case you would like to be  
3 considering them?

4 How much of a problem is this in the first place?

5 MR. SUMPSTER: We know of no equipment right now that  
6 we cannot meet this with.

7 MR. BOYD: I think that is the important thing.

8 MR. ROSS: That helps.

9 MR. BOYD: That is exactly the situation you want to  
10 be in.

11 MR. BOSNAK: This question only speaks to Class I,  
12 II, and III ASME components.

13 I mentioned the electrical area before. And it is  
14 also your intention to do that, because that is something that  
15 you are going to have to cover eventually?

16 MR. WHITE: Yes, it is.

17 MR. BOSNAK: It is.

18 DR. MATTSON: You are going to try to write it?

19 MR. SUMPSTER: Let us have a discussion for a few  
20 minutes.

21 DR. MATTSON: I think we can afford to break and,  
22 say, come back here at 10:30, pick it up and close the  
23 meeting.

24 (Recess.)

25 MR. MOON: Back on the record.

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MR. WHITE: Okay.

During our brief caucus, we came up with a couple of more commitments that we feel ought to resolve some of these items.

DR. MATTSON: All right.

MR. WHITE: The one we were talking about at the end of the meeting was how we would combine loads, SRSS versus absolute sum.

We have proposed to answer the question that we received in the following manner:

Applicant will apply the absolute summation method to ASME Class II, II and III components, and supports and Seismic Category I structures, except where the NRC requirements permit use of the SRSS method (e.g. NUREG 0484).

DR. MATTSON: We accept.

MR. WHITE: All right.

DR. MATTSON: Now, along with that acceptance, we have got another issue we want to open.

Bob went off and read your -- the way you wanted to straighten out the record on --

MR. BOSNAK: Right. We looked back at event No. 16, and it is not explicit in that definition, in the definition of Event 16.

I guess I gave Lonnie our copy of the page.

MR. MOON: Bob, the items are not numbered. It is the

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1 annulus pressurization question.

2 MR. BOSNAK: It is the annulus pressurization  
3 question, right.

4 MR. WHITE: And one of our folks is calling back to  
5 GE right now to reconfirm what it is our understanding that  
6 table means. So we will be changing the table to explicitly  
7 stae, "includes annulus pressurization."

8 MR. BOSNAK: The statement you made earlier on the  
9 record was certainly acceptable. That is what we are looking  
10 for. We just need the documentation.

11 MR. WHITE: And so we should be finding out before,  
12 again, the end of the day.

13 DR. MATTSON: I think you can straighten that one out  
14 with Cal and with Bob Bosnak.

15 I think we are finished.

16 MR. WHITE: I think we are finished with this  
17 meeting.

18 We do have a writeup for the sedimentation questions  
19 so we can talk to those fellows. And we have also got a writeup  
20 for the under voltage protection issue. And we are prepared  
21 to talk with Chapperall about a sequencer at this time.

22 And I think that pretty much -- and ATWS we are  
23 still looking at the Black Fox.

24 MR. SUMPTER: I think we got your writeup on ATWS  
25 before we left. Can we get to whoever we need to to see --

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1 DR. MATTSON: Mr. Thadani is here today.

2 MR. MOON: I think there is a question now of the  
3 number of copies of the transcript.

4 We have to make some copies of information to go in.  
5 We need to know how many. Can we arrive at a number.

6 DR. MATTSON: You are going to get one copy and  
7 then you are going to supply copies to everyone else?

8 MR. NEWMAN: I will assure that there will be  
9 copies in sufficient numbers for NRC's purposes.

10 DR. MATTSON: All right.

11 Now, do you want to talk about the ALAB 444  
12 business?

13 MR. BOYD: Yes. Let me wrap that up, I guess, by  
14 reiterating what we are targeting and proposing to do.

15 As I said earlier on the opening of this discussion,  
16 we are targeting, trying to get all inputs to the SER  
17 Supplement by January 8, put it together in a composite form,  
18 get it over to OELD by the 15th, get their comments, get them  
19 incorporated and get it back so that we can get it to the  
20 printers on January 26th, which, not being able to predict  
21 precisely what the printers can do, impinging on the New Year's  
22 holiday, we nonetheless hope to get this out by February 1st,  
23 which may in fact be, I suppose, possibly a day or so off.  
24 But at least we are trying to hold as firm as we can getting  
25 the things at least out of our hands by January 26th.

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1           In that regard this SER Supplement, in addition to  
2 wrapping up all the items we have discussed today, will  
3 include an appendix which deals with the ALAB 444 matters  
4 which we are also preparing -- I think previous discussions  
5 we indicated we would have that wrapped up, too.

6           On that note, if there are no more comments or  
7 questions, we appreciate you fellows coming down here on such  
8 an expedited basis.

9           I appreciate especially, Jack arranging to have  
10 this transcript taken, and subject to our completing a few  
11 of the loose ends this afternoon or whenever, we ought to  
12 all stop talking and start writing to get these matters  
13 resolved so we can go forward with the SER supplement.

14           Do you fellows have any point you want to make  
15 for posterity?

16           MR. SUMPTER: We thank you for getting all these  
17 people together on such quick notice, also, so that we could  
18 get all these out of the way quickly.

19           MR. WHITE: Thank you.

20           MR. MOON: I think this will end this meeting.

21           MR. BOYD: Yes.

22           (Whereupon, at 10:45 a.m., the hearing in the  
23 above entitled matter was adjourned.)

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